



# QST

devoted entirely to  
**AMATEUR RADIO**

December 1997

Official Journal of  
The American Radio  
Relay League

**QST reviews:**

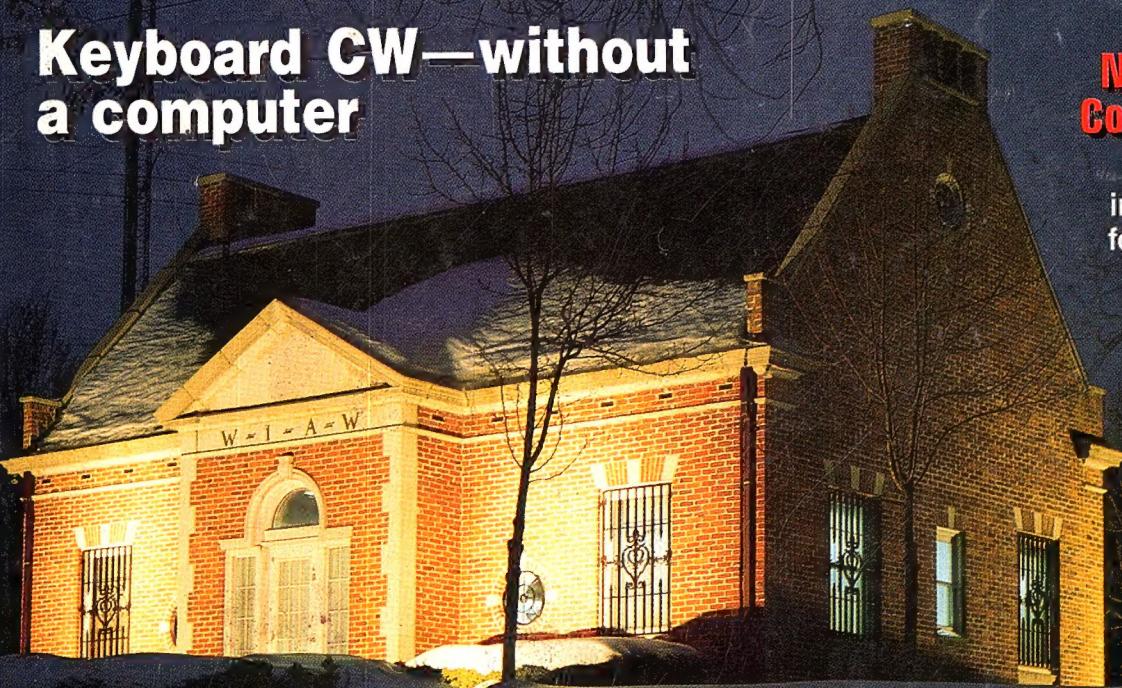
**2-meter "no frills" H-Ts**

**Keyboard CW—without  
a computer**

\$1-

**New Ham  
Companion:**

Practical  
information  
for all hams



**Build a simple 6-meter  
receiver**

**Plus...**

- Hams assist Boise festival
- The joys of HF mobile



*Happy Holidays* from **QST**



0 71896 47322 3

# FREE OPC-581 Separation Cable

When you purchase a new IC-706MKII from an authorized ICOM dealer between September 15, 1997 through December 31, 1997. See your dealer for complete details.



## ICOM IC-706MKII

### Base station performance with mobile-sized versatility

The ICOM IC-706MKII HF/VHF all mode transceiver is a powerful combination of next generation technology and ICOM's time-tested craftsmanship. Whether you use the IC-706MKII for base station activity, for mobile operations or on DXpeditions you can't go wrong.

### Compact Design

Extremely small and compact, this radio packs all of the features of a top class HF rig in a mobile-sized unit.

- Dimensions: 167(w) x 58(h) x 200(d)mm (6-9/16 x 2-9/32 x 7-7/8 inches)
- 2.5 kg (5.5 lbs)

### HF+6M+2M

Cover all modes (SSB, CW, RTTY, AM and FM) from HF to 6 meters AND 2 meters. A powerful 100 watts of output power on HF and 6 meters with 20 watts on 2 meters.

### Easy Operation

Switch bands with the touch of a button! The individual band change keys provide quick and easy QSY – the SUB DIAL for easy second VFO operation and RIT adjustment control. Each band stores pre-amp/attenuator and tuner ON/OFF settings.



#### Other Great Features:

- Enhanced 0.03-200 MHz broadband all mode receive
- Slots for 2 optional crystal filters
- Quiet Thermally Controlled Cooling Fan
- Crossband Split Operation
- Superior Transmit Audio Characteristics
- Large Speaker
- Tone Squelch (option UT-86 required)
- New 350 Hz RTTY Filter (opt.FL-232)

- Detachable Front Panel (Option OPC-581 required)
- "S" menu for quick access to 3 bands
- Built-in CI-V serial communications port
- Spectrum Scope
- IF Shift
- Narrow-FM
- 102 Memory Channels with Alphanumeric Display
- Large Dot-Matrix Display
- Optional UT-102 Voice Synthesizer
- Optional AT-180 Antenna Tuner
- Optional PS-85 DC Power Supply
- And Much More!



See your ICOM dealer  
or call 425-450-6088  
for a brochure

**ICOM**  
<http://www.icomamerica.com>

- **GREAT AUDIO THAT FITS MOST ANYWHERE!**

- 45 W VHF (2M), 35 W UHF (440 MHz)
- One Touch Band Selection
- Wide Band Rx (Air Band, Too!)
- 9600 BPS Packet Ready (6 pin connection point)
- CTCSS Encode/Decode
- 162 Memory Channels
- High Scan Speeds
- Built-In Duplexer
- Auto Repeater
- Optional Infrared Wireless Mic (opts. HM-90 + EX-1759)



ICOM options required for PC cloning:  
CS-207 Cloning Software,  
OPC-646 Cloning cable  
A third party 6-pin serial cable is required for PC packet connection.



Under 4 1/2 inches wide!  
Front Panel: 4 1/32 (w) x 1 17/32 (h) x 1 1/16 (d)

## IC-207H Easy Dual Bander

# ICOM MOBILE

## FREE Separation Cable

Get a FREE OPC-600 separation cable when you purchase a new IC-207H or IC-2710H from an authorized ICOM America dealer between September 20, 1997 and December 31, 1997.

To receive your free OPC-600 separation cable, complete an ICOM America manufacturer's rebate coupon (available from an authorized dealer), and mail it in along with a copy of your dated sales receipt and your warranty card to ICOM America Free OPC-600 Offer, 2380-116th Ave NE, Bellevue, WA 98004. Allow 4 - 6 weeks for delivery. All submissions must be postmarked by January 31, 1998. U.S. and Canada residents only.

ICOM options required for PC cloning:  
CS-2710 Cloning Software,  
OPC-646 Cloning cable.  
A third party 6-pin serial cable is required for PC packet connection.



## IC-2710H Advanced Dual Bander

- **"BULLET PROOF" CONSTRUCTION!**

- 50 W VHF (2M), 35 W UHF (440 MHz)
- Wide Band Rx (Air Band, Too!)
- Independent Band Display Readouts, Volume and Squelch Knobs, and Function Switches
- 50 CTCSS Frequencies
- V/V, U/U Simultaneous Receive
- 220 Memory Channels
- High Speed Scanning

- Programmed Scan (with 3 scan edges) and Memory Scan Functions
- Built-In Duplexer
- Pager, Tone Squelch and External DTMF Control Via Sub Band (opt. UT-49)
- Pocket Beep and Tone Squelch (opt. UT-104)
- Optional Infrared Wireless Mic (opts. HM-90 + EX-1759)

Call today for a brochure  
**425-450-6088**

**ICOM**  
PC Powered!  
<http://www.icomamerica.com>

PRESENTING:

# The 75th Anniversary Edition of The ARRL Handbook!

Now is the time to own  
the #1 selling book in  
Amateur  
Radio

We've reduced  
the price of this  
one-time  
**SPECIAL  
EDITION!**

NOW  
JUST  
**\$32**



It's been the ultimate source of radio communications and electronics information since 1926, with over 6 million copies sold to date. Here's just some of what you'll find in this collector's Anniversary Edition:

- Easy-to-read explanations of the theory behind electronics and radio communications, including often-used formulas
- New projects—including a high power, high efficiency antenna tuner, a new superregenerative VHF receiver that automatically receives several different types of modulation, and an integrated L-band antenna and amplifier for use with the amateur satellites.
- Hundreds of tables that provide valuable reference data
- Updated volatile information
- Reader-friendly printed thumb tabs and a mini-table of contents for most chapters
- And much more in 1200 pages packed with clear explanations and practical projects

All the information you need—all in one place—at a price that can't be beat. Reserve your copy of *The 1998 ARRL Handbook For Radio Amateurs* today. ARRL Order Number 1786—Retail \$32 plus \$6 for shipping and handling (UPS).

Call our toll-free number **1-888-277-5289** today. 8 AM-9 PM Eastern time

**ARRL**

e-mail: [pubsales@arrl.org](mailto:pubsales@arrl.org) World Wide Web: <http://www.arrl.org/>

225 Main Street, Newington, CT 06111-1494 tel: 860-594-0250 fax: 860-594-0303

We'll be happy to take your order or provide you with the location of an ARRL Publications Dealer in your area.

# DSP solution with easy operation.

**Kenwood's TS-570D/S HF Transceiver gives you high-end digital performance in an easy-to-use package for any home, mobile or DX-pedition.**



## TS-570D HF TRANSCEIVER TS-570S HF + 6M TRANSCEIVER

Cruise the upper reaches of elegant HF performance in a compact, affordable transceiver incorporating advanced AF-stage DSP for crystal-clear TX and RX audio, digital filtering for sophisticated signal isolation and extraction, **Central Frequency Control System** for high stability, and a full range of enhanced operator features.

The DSP filters and extracts signals utilizing computer algorithms that would be impossible to match with standard analog circuits. The DSP also provides **CD-class transmit and receive audio quality** that can be shaped at will, and two powerful noise reduction systems: **Line Enhancer Method** for SSB/AM modes, and **Speech Processing by Auto Correlation** (SPAC) for CW mode. DSP also enables the **CW-Auto Tune** feature that automatically zero-beats CW signals.

The **Extensive Memory Functions** provide a bank of 100 memory positions split into 90 standard channels for general operation and 10 for programmable VFO, programmable scan and long-term memory. You can scroll memory contents, copy from one memory to another, and lock out specific memory channels. In addition there are 5 **quick memories** for storing frequencies and

modes on the fly, perfect for the busy DX contesteer.

The new easy-to-use **Menu System** incorporates **46 menu features** plus an **on-line guide** so you'll never have to drag your owner's manual around again. The **large amber backlit LCD display** provides 4 light levels for clear, concise operational information display under any lighting conditions.

The TS-570D/S exhibits no compromises when it comes to construction and performance.

The **continuous-duty 100 watt transmitter** features a large heavy-duty heat sink with integrated cooling fan for non-stop operation even in extreme environmental conditions. The **wide-band receiver** delivers stable coverage from 500 kHz through 30 MHz with dual **pre-amps** and **dual bandpass filters** for exceptional selectivity and sensitivity.

With the features and performance of a high-end radio integrated into an affordable mobile-size package, the TS-570D/S is the perfect choice for the field or to build a full station around at home.

- **Channel scan, program band scan, memory scan with channel lock-out and group channel scan, all with TO (time operated) or CO (carrier operated) resume modes**

- **Compact 10 5/8 inch by 3 3/4 inch front panel size for any mobile installation**
- **Preset auto antenna tuner with 18 sub-bands**
- **Variable electronic keyer with speed settings between 0 and 100 wpm**
- **Packet and FSK features**
- **RCP-2 software for PC-based display and memory configurations**
- **57.6 kbps PC control option via 9-pin D-SUB and RS-232C interface**
- **Memory data transfer between radios (optional IF-232C required)**
- **Full functionality on 6M (TS-570S) including DSP, 100 watts output and preset Auto Antenna Tuner**
- **CW message memories**
- **10-key direct frequency entry**
- **Optional VS-3 voice synthesizer**
- **Optional DRU-3A digital recording unit**



ISO 9001  
JQA-1205

**KENWOOD**  
Amateur Radio Products Group

97ARD-1679

KENWOOD COMMUNICATIONS CORPORATION

AMATEUR RADIO PRODUCTS GROUP

P.O. Box 22745, 2201 E. Dominguez St., Long Beach, CA 90801-5745, U.S.A.

Customer Support/Brochures (310) 639-5300

KENWOOD ELECTRONICS CANADA INC.

6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

**INTERNET**

**Kenwood News & Products**

<http://www.kenwood.net>

**Kenwood Bulletins**

<ftp://ftp.kenwood.net>

**QST** (ISSN:0033-4812) is published monthly as its official journal by the American Radio Relay League, 225 Main Street, Newington, CT 06111-1494. ARRL yearly membership dues (including a subscription to **QST**), are \$34 worldwide. To compensate for additional postage for mailing outside the US please remit \$47. Complete membership information is shown on page 5. Periodicals postage paid at Hartford, CT, and at additional mailing offices. POSTMASTER: Form 3579 requested. Send address changes to: **QST**, 225 Main St, Newington, CT 06111-1494

See page 10 for detailed contact information.  
**Telephone:** 860-594-0200  
**Fax:** 860-594-0259

David Sumner, K1ZZ  
*Publisher*  
 Mark J. Wilson, K1RO  
*Editor*  
 Steve Ford, WB8IMY  
*Managing Editor*  
 Joel P. Kleinman, N1BKE; Paul Pagel, N1FB  
*Associate Technical Editors*  
 Larry D. Wolfgang, WR1B; Dean Straw, N6BV;  
 Rick Lindquist, N1RL; Robert Schetgen, KU7G  
*Senior Assistant Technical Editors*  
 Paul Danzer, N1II  
*Assistant Technical Editor*  
 Ed Hare, W1RFI; Zack Lau, W1VT;  
 Mike Tracy, KC1SX; Joe Bottiglieri, AA1GW  
*Laboratory Staff*  
 Rick Palm, K1CE  
*Public Service*  
 Billy Lunt, KR1R; Bev Fernandez, N1NAV  
*Contests*  
 Mary E. Garcia, N7IAL  
*At the Foundation*  
 Bill Kennamer, K5FUV  
*DXCC, How's DX?*  
 Bill Moore, NC1L  
*VUCC*  
 Steve Ewald, WV1X  
*Club Spectrum*  
 John Hennessee, N1KB  
*Washington Mailbox*  
 Jay Mabey, NU0X  
*FM & Repeaters*  
 John Troster, W6ISQ; Emil Pocock, W3EP;  
 Diane Ortiz, K2DO; Stan Horzepa, WA1LOU;  
 Paul L. Rinaldo, W4RI; Al Brogdon, W1AB  
*Contributing Editors*  
 Michelle Bloom, WB1ENT  
*Production Supervisor*  
 Jodi Morin, KA1JPA  
*Asst Production Supervisor/Layout*  
 Sue Fagan  
*Graphic Design Supervisor*  
 David Pingree, N1NAS  
*Senior Technical Illustrator*  
 Michael Daniels  
*Technical Illustrator*  
 Joe Shea, Paul Lappen  
*Production Assistants*  
 Steffie Nelson, KA1IFB  
*Proofreader*  
 Brad A. Thomas, KC1EX  
*Advertising Manager*  
 Hanan AlQaddumi, KB1AFX;  
 Robin Micket, N1WAL  
*Advertising Assistants*  
 Debra Jahnke  
*Circulation Manager*  
 Kathy Capodicasa, N1GZO  
*Deputy Circulation Manager*

## Technical

**32 A Computer Keyboard CW Encoder** *Ron Alspaugh, W6NKS*  
 Grab an old PC keyboard and start sending CW—without a computer!

**36 The Triple Tickler** *Mark L. Meyer, WUØL*  
 Automate your battery maintenance with this simple project.

**39 An Ultra-Simple Receiver for 6 Meters** *Charles Kitchin, N1TEV*  
 About \$20 and a few hours of your time is all it takes!

**60 Product Review** *Rick Lindquist, N1RL*  
**QST** compares seven 2-meter “no frills” hand-held transceivers.



60



28

## News and Features

**9 “It Seems to Us...”: Are We Our Own Worst Enemy?**

**15 DC Currents** *Steve Mansfield, N1MZA*  
 Wrapping up the 1997 telecommunications bills; Tauzin bill update; new FCC Commissioners headed for Senate confirmation.

**28 The Boise River Festival: An Amateur Radio Showcase** *Tony Barrett, N7MTZ, and Steve Wade, KF7YC*  
 When Boise needed help with a big community event, area hams used everything from APRS to ATV.

**42 SAREX: Looking for Tomorrow's Scientists Today** *Michelle "Missy" D. Hollenbeck, AA0OF*  
 The students of Andover Middle School were thrilled to work astronaut Jay Apt, N5QWL, aboard the space shuttle. But no one expected to actually *meet him!*

**44 The Digital Audio Radio Service** *Kirk A. Kleinschmidt, NTØZ*  
 Digital audio broadcasting is coming soon to your home and car. How does this new technology work?

**48 Radio Coaches** *Jennifer Gagne, N1TDY*  
 The League has a new program to bring more young people into Amateur Radio. This is your opportunity to get involved!

**73 Happenings** *Rick Lindquist, N1RL*  
 Amateur Radio legend Doug DeMaw, W1FB, SK; Vanity Gate 4 opens; Florida judge throws out case against ham; ARRL seeks changes to CW waiver rules; ham radio now an “official” International Space Station payload; FCC issues new form 610—old versions obsolete; more!

**112 Index to Volume 81—1997**

# New Ham Companion

## 49 The Doctor is IN

Sound card connections; cross-band contacts; VHF MARS frequencies; 56 kbaud modems, more!

## 51 On the Road: The Joys of HF Mobile

Can't ham from home? Try it from your car!

Steve Ford, WB8IMY

## 55 Test Your Knowledge!

How well do you know your connectors?

H. Ward Silver, N0AX

## 56 The Crystal Radio

Build this receiver tonight and rediscover the true magic of radio.

Dave Evison, W7DE

## 58 HF QRP "Foxhunting"

Here's an exciting way to spend your winter evenings. Do a little foxhunting without leaving the comfort of your shack.

Brad Mugleston, KB0ROL

105



# Operating

## 100 General Rules for All ARRL Contests

Chuck Hutchinson, K8CH

100 Straight Key Night Rules

101 1998 ARRL RTTY Roundup Rules

102 1998 ARRL International DX Contest Rules

104 1998 ARRL January VHF Sweepstakes Rules

## 105 1997 ARRL June VHF QSO Party Results

Billy Lunt, KR1R, and Bev Fernandez, N1NAV

## 110 1997 ARRL August UHF Contest Results

Billy Lunt, KR1R, and Bev Fernandez, N1NAV

# Departments

Amateur Radio World	91	Public Service	83
Amateur Satellites	93	Section News	119
Contest Corral	98	Silent Keys	97
Coming Conventions	96	Special Events	99
Correspondence	24	Strays	47, 89, 96, 98
Digital Dimension	94	Technical Correspondence	71
DX Century Club Awards	81	The World Above 50 MHz	86
Feedback	72	This Month in Amateur Radio	26
FM & Repeaters	90	Up Front in QST	19
Ham Ads	178	VHF/UHF Century Club	89
Hamfest Calendar	96	W1AW Schedule	31
Hints and Kinks	69	Washington Mailbox	92
How's DX?	79	We're at Your Service	10
Index of Advertisers	206	YL News	95
Moved & Seconded	77	75, 50 and 25 Years Ago	97
New Products	35, 38, 47, 59, 68, 72, 82, 99		

## Our Cover

Has ARRL Headquarters station W1AW moved to a new location? On a frosty, magical Christmas night, anything can happen! Don't be surprised if you hear a little "polar flutter" on our signals, or possibly the faint jingle of silver bells. Best wishes for a happy Holiday Season from everyone at QST!

Membership in the ARRL, including a subscription to *QST*, is available to individuals at the following rates: \$34 per year in the US and possessions, \$47 elsewhere, payable in US funds. Age 65 and over, with proof of age, \$28 (US only). Licensed radio amateurs age 21 and under may qualify for special rates; write for application. Life membership is also available. Membership and *QST* cannot be separated. Fifty percent of dues is allocated to *QST*, the balance for membership. Subscription rate for libraries and institutions: \$34 per year postpaid in the US and possessions, \$47 elsewhere. Single copies \$5 in the US.

Membership without *QST* is available to the immediate family of a member living at the same address, and to anyone who is legally blind, for \$5 per year.

Foreign remittances should be by international postal or express money order or bank draft negotiable in the US and for an equivalent amount in US funds.

Copyright ©1997 by the American Radio Relay League Inc. Title registered at the US Patent Office. International copyright secured. All rights reserved. Quedan reservados todos los derechos. Printed in the USA.

*QST*®, DXCC® and DX Century Club® are registered trademarks of the American Radio Relay League. The ARRL and *QST* in no way warrant the products described or reviewed herein.

*QST* is available to blind and physically handicapped individuals on flexible disks from the Library of Congress, National Library Service for the Blind and Physically Handicapped, Washington, DC 20542.

Indexed by Applied Science and Technology Index, Library of Congress Catalog Card No: 21-9421

## Reprint Permission

For permission to quote or reprint material from *QST* or any ARRL publication, send a written request including the issue date (or book title), article, page numbers and a description of where you intend to use the reprinted material. Send the request to the office of the Publications Manager (e-mail [permission@arrl.org](mailto:permission@arrl.org))

In order to ensure prompt delivery, we ask that you periodically check the address information on your mailing label. If you find any inaccuracies, please contact the Circulation Department immediately. Thank you for your assistance.

# THE VECTRONICS HFT-1500 . . . THE FINEST HIGH POWER ANTENNA TUNER MADE!

- high current Roller Inductor
- SSB\*Analyzer Bargraph™
- Cross-Needle Meter
- 6 position Antenna Switch
- built-in 4:1 Balun
- gear driven Turns Counter

HFT-1500  
**\$459<sup>95</sup>**

*The VECTRONICS HFT-1500 is not just an antenna tuner . . . it's a beautifully crafted work of art, using the finest components available and the highest quality construction.*

Every HFT-1500 aluminum cabinet is carefully crafted with a durable baked-on paint that won't scratch or chip.

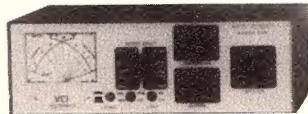
The attractive two-color Lexan front panel is scratch-proof. Take a quarter. Scratch the HFT-1500 front panel as much as you want. You won't leave a mark!

#### Arc-Free Operation

Two heavy duty 4.5 KV transmitting variable capacitors and a massive high current roller inductor gives you arc-free operation up to 2 kW PEP SSB.

#### 300 Watt Antenna Tuner

VC-300DLP  
**\$159<sup>95</sup>**



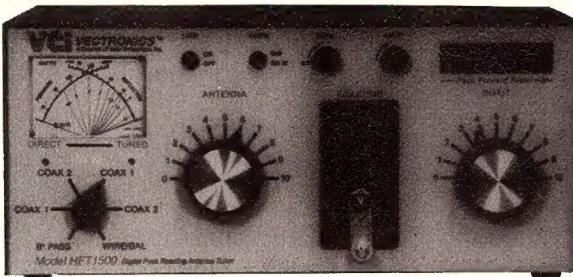
VECTRONICS uses the finest components available to build the highest quality 300 Watt antenna tuner ever made.

You can tune any antenna 1.8-30 MHz. Custom 48 position switched inductor and continuous rotation 1000 Volt capacitors provide arc-free operation. Handles 300 Watts PEP SSB, (150 Watts on 1.8 MHz).

8 position antenna switch, built-in 50 ohm dummy load, peak reading backlit cross-needle SWR Power meter, 4:1 balun for balanced line antenna. Scratch-proof Lexan front panel. 10.2x9.4x3.5 in. Weighs 3.4 lbs.

#### 1500 Watt dry Dummy Load

DL-650M, \$64.95. Handles 100 watts continuous, 1500 Watts for 10 seconds to 650 MHz. Ceramic resistor. SWR < 1.3. SO-239 connector. DL-650MN, \$69.95 has N connector.



#### Precision Resetability

A sturdy hand cranked roller inductor lets you quickly fly from band to band. A precision 5-digit gear driven turns counter lets you accurately return to your previous settings.

Large comfortable knobs and smooth vernier drives on the variable capacitors make tuning precise and easy. Bright red pointers on logging scales make accurate resetability a breeze.

#### Absolute Minimum SWR

You can tune your SWR down to absolute minimum!

Why? Because all three matching network components, the roller inductor and both variable capacitors, are fully adjustable.

#### Tune any Antenna

You can tune any real antenna from 1.8 to 30 MHz, including all MARS and WARC

#### 300 Watt Mobile Tuner

VC-300M  
**\$109<sup>95</sup>**



The VC-300M Mobile Antenna Tuner is compact, lightweight, easy-to-operate and is our most economical tuner.

It's compatible with any mobile antenna and any mobile HF transceiver and is compact enough to fit in the most compact car.

It can also be used at home with dipoles, vees, verticals, beams or quads fed by coax.

Backlit dual movement meter simultaneously monitors Power and SWR. Covers 1.8-30 MHz. Handles 300 Watts SSB PEP, 200 Watts continuous, (150 Watts on 1.8 MHz.). 7.25x8.75x3.6 in. Weighs 3.4 lbs.

#### Low Pass TVI Filter



LP-30, \$69.95. Eliminates TVI by attenuating harmonics at the source. Plugs between transmitter and antenna or tuner. Handles 1500 watts.

bands. You can tune verticals, dipoles, inverted vees, yagis, quads, long-wires, whips, G5RVs, etc . . .

**SSB\*Analyzer Bargraph™**  
VECTRONICS' exclusive 21 segment bargraph display lets you visually follow your instantaneous voice peaks. Has level and delay controls.

#### Accurate SWR/Power Meter

A shielded directional coupler and backlit Cross-Needle meter displays accurate SWR, forward and reflected power simultaneously. Reads both peak and average power on 300/3000 Watt scales.

**6 Position Ceramic Antenna Switch**  
Select two coax fed antennas (tuned or bypassed), balanced line/wire or bypass.

#### Built-in Balun

A 4:1 Ruthroff voltage balun feeds dual high voltage Delrin terminal posts for balanced lines. HFT-1500 is 5.5x12.5x12 inches.

#### Try any product for 30 days

Call toll-free 800-363-2922 and order any product from VECTRONICS. Try it for 30 days. If you're not completely satisfied return it for a full refund, less shipping and handling -- no hassles. All VECTRONICS products come with a one year warranty.

#### SWR/Power Meters



PM-30  
**\$79<sup>95</sup>**  
PM-30UV  
**\$89<sup>95</sup>**

PM-30, \$79.95, for 1.8 to 60 MHz. Displays forward and reflected power and SWR simultaneously on dual movement Cross-Needle Meter. True shielded directional coupler assures accuracy. Backlit meter displays peak or average power in 300/3000 Watt ranges. First-rate construction includes scratch-proof case/front panel. 5.3x5.75x3.5 inches. SO-239 connectors. For 144/220/440 MHz, 30/300 Watt ranges. PM-30UV, \$89.95, has SO-239 connectors. PM-30UVN, \$89.95, has N connectors. PM-30UVB, \$89.95, has BNC connectors.

#### High Pass TVI Filter



HPF-2, \$24.95. Installs between VCR/TV and cable TV or antenna lead-in cable. Eliminates or reduces interference caused by nearby HF transmitters.

# VECTRONICS<sup>®</sup>

*... the finest amateur radio products made*

VECTRONICS 1007 Hwy 25 S, Starkville, MS 39759 USA VOICE: (601)323-5800 FAX: (601)323-6551 Web: <http://www.vectronics.com>

**Free catalog, nearest dealer or to order call 800-363-2922**

# ICOM

## BASE STATIONS

World's  
Smallest



### IC-706MKII

All Mode Transceiver • HF + 6M (100 W)  
SSB/CW/AM/FM RTTY • 2M (20 W)

**HF+6M+2M!**  
SSB/CW/FM/RTTY • Detachable Control Panel/Display\* • SSB/CW/AM Narrow Filter Options • 101 Alphanumeric Memories • General Coverage Rx • Noise Blanker • IF Shift • Preamp Attenuator • CW Keyer • CW Pitch Control • Full Break-in (QSK) • Speech Processor • VOX • LCD Display with 1 Hz Readout • Easy-to-use Menu System • Tone Encode Built-In • 2 Antenna Connectors • 6.6"(W), 2.3"(H), 7.9"(D), 5.5 lb

## HANDHELDS



### IC-T22A/IC-T42A

2M/440 MHz Single Band • Fun, Shirt Pocket Small &amp; Easy to Use • Large Alphanumeric Display • Wide Rx Coverage • 5 W @ 13.5 V (3 W Out of the Box) • Air Band Rx • 80 Memory Channels (40 w/ Alpha Display) • 2.3"(W), 4.3"(H), 1.1"(D), 10.9 oz

### IC-W32A

2M/440 MHz Dual Band • 5 Watts Out of the Box • No Function Key • 200 Memories with Alphanumeric Display, Messaging & Paging • "Intuitive" Help Display • Backlit Display & Keypad • Wide Band Rx (Including Air Band) • V/V, V/U, U/U Operation with VHF/UHF Tuning Knob Exchange • Encode/Decode • 2.2"(W), 4.9"(H), 1.2"(D), 12 oz



### IC-T7A HP

2M/440 MHz Dual Band • Dual Bander at a Single Bander Size & Price • Easy to Use! No Function Key • MORE POWER! 5 W (2M)/4 W (440 MHz) Out of the Box • "Intuitive" Help Display • CTCSS Encode/Decode • 2.5"(W), 4.8"(H), 1.1"(D), 11.3 oz



Ni-Cd or Alkaline Powered

X-tra  
Rugged

### IC-T2A

2 Meter Single Bander • PC Programmable\* • Built-In CTCSS Encode/Decode with Pocket Beep & Tone Scan • Rugged Aluminum Chassis • 8 Programmable Keys • 43 Memory Channels • Uses Ni-Cd or Alkaline Power (8 Ni-Cd "AA" included) • 4.5 Watts of Power • 2.3"(W), 5.5"(H), 1.3"(D), 10.9 oz



## MOBILES



### IC-2000H

2M Intermod Fighter • Wide Band Rx (118–174 MHz) • Highly Intermod Resistant • 50 Watts of Power • 50 Memory Channels with Alphanumeric Display • AM Aircraft Rx • 5.9"(W), 2.0"(H), 5.9"(D), 2.4 lb

### IC-2710H



2M/440 MHz Dual Band Mobile • 2M (50 Watts)/440 MHz (35 W) • Detachable Control Panel\* • Fast Scanning • 220 Memory Channels • PC Programmable • CTCSS Encode (decode opt.) • RF Attenuator • 8 DTMF Memory Switches • V/V, U/U Simultaneous Rx • Built-In Duplexer • 5.5"(W), 1.6"(H), 8.4"(D), 3.1 lb

WOW

### IC-207H

2M/440 MHz

Dual Band Mobile • 2M (45 W)/440 MHz (35 W) • Super-Compact Detachable Control Panel\* with Big Keys, Big Knobs and Big Display • One-Touch Switch Between Bands • 9600 Baud Ready • 182 Memory Channels • CTCSS Encode/Decode • Faceplate: 4.4"(W), 1.6"(H), 1.1"(D)



## RECEIVERS



**IC-R10** Advanced, Yet Easy to Use Handheld • Wide Band Coverage – 5–1300 MHz\* • All Mode: FM, WFM, AM, USB, LSB, CW • 'Real Time' Band Scope • New 'Signal Navigation' (SIGNAVI) Scan • 1000 Memory Channels

### IC-R8500

Next Generation HF/VHF/UHF World Receiver • Wide Frequency Range: 100 kHz – 2000 MHz\* • All Mode • Superior Receive Characteristics • Built-In CI-V and RS-232C Hardware for Advanced Computer Control • IF-Shift • Audio Peak Filter (APF) • Noise Blanker (SSB/AM) • RF Attenuator • 1000 Channels • 2 Antenna Connectors



Most ICOM Radios are



With Select ICOM Options



See the entire line of ICOM radios on our website at <http://www.icomamerica.com>

Call ICOM's brochure hotline: (425) 450-6088, or contact ICOM Technical Support in the HamNet forum on CompuServe® @75540.525 (Internet: 75540.525 @ compuserve.com.)

©1997 ICOM America, Inc., 2380-116th Ave. N.E., Bellevue, WA 98004. The ICOM logo is a registered trademark of ICOM, Inc. \*Optional Equipment required. †Cellular blocked: unblocked OK to FCC approved users. All stated specifications are subject to change without notice or obligation. All ICOM radios significantly exceed FCC regulations limiting spurious emissions. CompuServe is a registered trademark of CompuServe, Incorporated. DAYTON1097Y

### IC-756

Great  
Audio

HF+6M • TRUE Dual Watch • 4.9" Concentrated Information LCD Dot Matrix Display with Spectrum Scope, Alphanumeric Memories and Soft Key Buttons • 100 W Stable Output Power (40 W AM) • SSB/AM FM/CW/RTTY • Built-In Automatic Antenna Tuner • 101 Memory Channels • Automatic Audio Notch Filter • Twin PBT • 13.4"(W), 4.4"(H), 11.2"(D), 23.1 lb



IF-DSP

### IC-775DSP

Pull Out Those Weak Signals • IF-DSP (Digital Signal Processing) on Tx and Rx • 200 W Stable Output Power • SSB/AM/FM/XCW/RTTY • Built-In Heavy Duty Power Supply • Built-In Auto Antenna Tuner • DSP Notch Filter • Adjustable DSP Noise Reduction • Level/Width Variable Noise Blanker • PSN Modulation • 16.7"(W), 5.9"(H), 15.4"(D), 36.8 lb



### IC-821H

2M/440 MHz Advanced Satellite/Digital Base Station • All Mode • Easy to Use • Continuous Adjustable Transmit Power • Sub Band Transmit • 9600 Full Compatibility Out of the Box • 160 Memories • Noise Blanker & IF-Shift on Main & Sub bands (independent main/sub Rx) • Built-In Electronic Keyer • Compact! 9.5"(W), 3.7"(H), 9.4"(D), 11.0 lb



Ni-Cd or Alkaline Powered

X-tra  
Rugged

### IC-T2A

2 Meter Single Bander • PC Programmable\* • Built-In CTCSS Encode/Decode with Pocket Beep & Tone Scan • Rugged Aluminum Chassis • 8 Programmable Keys • 43 Memory Channels • Uses Ni-Cd or Alkaline Power (8 Ni-Cd "AA" included) • 4.5 Watts of Power • 2.3"(W), 5.5"(H), 1.3"(D), 10.9 oz

### IC-207H

2M/440 MHz

Dual Band Mobile • 2M (45 W)/440 MHz (35 W) • Super-Compact Detachable Control Panel\* with Big Keys, Big Knobs and Big Display • One-Touch Switch Between Bands • 9600 Baud Ready • 182 Memory Channels • CTCSS Encode/Decode • Faceplate: 4.4"(W), 1.6"(H), 1.1"(D)



Most ICOM Radios are



With Select ICOM Options

ICOM®

10, 15, 20 Meters  
9 Elements on a 28 ft (8.6m) Boom  
Optional 2 Element 40 Meter Kit

**BIG THUNDER**  
SERIES



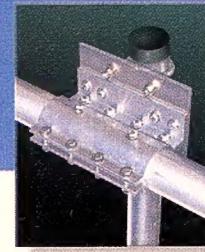
**X9**



10, 15, 20 Meters  
7 Elements on an 18 ft (5.5m) Boom  
Optional Driven Element for 40 M



Boom to Mast Clamp



Element to Boom  
Mounting



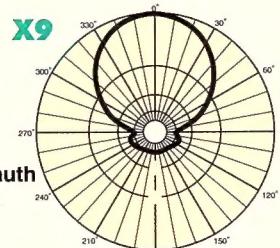
## The Performance Tribander for the DX Years Just Ahead

- New High Efficiency Computer Optimized Design for Maximum Gain and Ultra Clean Radiating Pattern
- 100+ MPH Construction for Best Reliability and Long Life
- NEW 4L Log Cell Driven Elements for better VSWR Bandwidth
- Trapless Driven Elements and Reflectors for Reliable Power Handling
- Interleaved Element Design for Mono-Band Performance
- Add-on kits available for 40 Meters

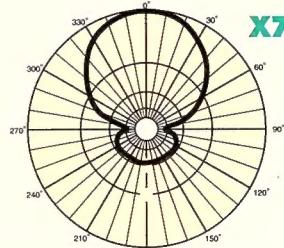
The new X9 and X7 Triband Yagis are geared to set new standards in both radiating performance and mechanical reliability. Cushcraft's product development team has employed the latest computer modeling technology to achieve a superior electrical design as well as elegant new mechanical hardware and assembly techniques.

Each mechanical component was designed to 100+ MPH wind survival

with a 1.25 safety factor. Traps were eliminated from the high current driven elements and reflectors using the new 4L Log Cell design, which yields virtual monoband performance and maximum power handling capability. Traps are employed only in the lower current directors for increased gain and sharper pattern. The result is a truly high performance antenna family which will easily handle the legal limit.



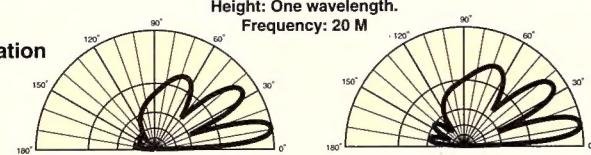
Azimuth



X7

Typical radiation patterns.  
Height: One wavelength.  
Frequency: 20 M

Elevation



**CUSHCRAFT**  
COMMUNICATIONS ANTENNAS

SPECIFICATIONS	X9	X7
Frequency Coverage (Meters)	10, 15, 20	10, 15, 20
Total number of Elements	9	7
Number of Elements per Band	4	3
VSWR Minimum	1.1:1	1.1:1
VSWR 1.5:1 Bandwidth (KHz)	20M 350 15M 450 10M 1500	600 750 1700
Longest Element, ft (m)	36.5 (11.12)	37.2 (11.33)
Turning Radius, ft (m)	21.7 (6.61)	20.0 (6.09)
Boom Length, ft (m)	28 (8.53)	18 (5.49)
Boom Diameter, in (cm)	2-1/2 (6.35)	2-1/2 (6.35)
Maximum Mast Diameter OD, in (cm)	2-1/2 (6.35)	2-1/2 (6.35)
Maximum Wind Survival, mph (kph)	>100 (>161)	>100 (>161)
Maximum Wind Surface Area, ft <sup>2</sup> (m <sup>2</sup> )	9.9 (.92)	7.9 (.73)
Windload @ 80 mph, lb (kg)	255 (116)	202 (92)
Maximum Power Handling (KW)	2	2
Weight, lb. (kg)	85 (38.5)	60 (27.2)
List Price	\$995	\$675

# THE AMERICAN RADIO RELAY LEAGUE INC



The American Radio Relay League Inc is a noncommercial association of radio amateurs, organized for the promotion of interest in Amateur Radio communication and experimentation, for the establishment of networks to provide communication in the event of disasters or other emergencies, for the advancement of the radio art and of the public welfare, for the representation of the radio amateur in legislative matters, and for the maintenance of fraternalism and a high standard of conduct.

ARRL is an incorporated association without capital stock chartered under the laws of the State of Connecticut, and is an exempt organization under Section 501(c)(3) of the Internal Revenue Code of 1986. Its affairs are governed by a Board of Directors, whose voting Members are elected every two years by the general membership. The officers are elected or appointed by the Directors. The League is noncommercial, and no one who could gain financially from the shaping of its affairs is eligible for membership on its Board.

"Of, by, and for the radio amateur," the ARRL numbers within its ranks the vast majority of active amateurs in the nation and has a proud history of achievement as the standard-bearer in amateur affairs.

A *bona fide* interest in Amateur Radio is the only essential qualification of membership; an Amateur Radio license is not a prerequisite, although full voting membership is granted only to licensed amateurs in the US.

Membership inquiries and general correspondence should be addressed to the administrative headquarters; see page 10 for detailed contact information.

## Founding President

Hiram Percy Maxim, W1AW

## Past Presidents

H. P. MAXIM, W1AW, 1914-1936  
E. C. WOODRUFF, WBCMP, 1936-1940  
G. W. BAILEY, W2KH, 1940-1952  
G. L. DOSLAND, W0TSN, 1952-1962  
H. HOOVER, JR, W6ZH, 1962-1966  
R. W. DENNISTON, W0DX, 1966-1972  
H. J. DANNALS, W2TUK/W2HD, 1972-1982  
V. C. CLARK, W4KFC, 1982-1983  
C. L. SMITH, W0BWJ, 1983-1984  
L. E. PRICE, W4RA, 1984-1992  
G. WILSON, W4OYI, 1992-1995

## Officers

**President:** RODNEY STAFFORD,\* KB6ZV  
5155 Shadow Estates, San Jose, CA 95135;  
e-mail kb6zv@arrl.org

**First Vice President:** STEPHEN A. MENDELSON, W2ML,\* 318 New Milford Ave, Dumont, NJ 07628 (201-384-0570/0680); e-mail w2ml@arrl.org

**Vice President:** JOEL M. HARRISON, W5ZN, 528 Miller Rd, Judsonia, AR 72081 (501-729-3301); e-mail w5zn@arrl.org

**Vice President:** HUGH A. TURNBULL, W3ABC, 6903 Rhode Island Ave, College Park, MD 20740 (301-927-1797); e-mail w3abc@arrl.org

**International Affairs Vice President:** LARRY PRICE, W4RA, PO Box 2067, Statesboro, GA 30459-2067; e-mail w4ra@arrl.org

**Executive Vice President:** DAVID SUMNER, K1ZZ  
**Secretary:** DAVID SUMNER, K1ZZ

**Treasurer:** JAMES McCOBB Jr, W1LU

**Chief Financial Officer:** BARRY J. SHELLEY, N1VXY

## Staff

### Technical Relations Manager

Paul Rinaldo, W4RI

### Legislative and Public Affairs Manager

Steve Mansfield, N1MZA

### PUBLICATIONS

**Manager:** Mark Wilson, K1RO

### Advertising Department

Brad Thomas, KC1EX, Manager

### Circulation Department

Debra Jahnke, Manager

Katherine Capodicasa, N1GZO, Deputy Manager

### Educational Activities Department

Rosalie White, WA1STO, Manager

### MEMBERSHIP SERVICES

**Manager:** Charles Hutchinson, K8CH

### FIELD SERVICES

**Manager:** Richard Palm, K1CE

### VOLUNTEER EXAMINER DEPARTMENT

**Manager:** Bart Jahnke, W9JJ

### General Counsel

Christopher Imlay, W3KD

### Business Staff

**BUSINESS MANAGER:** Barry J. Shelley, N1VXY

### Information Services

Don Durand, Manager

**Comptroller:** Anthony J. Mascaro Jr

**Office Manager:** Robert Boucher

\*Executive Committee Member

# "It Seems to Us..."

## Are We Our Own Worst Enemy?

*"We has met the enemy, and it is us." —Walt Kelly (Pogo)*

Members' contributions in response to the Defense Fund solicitation mentioned here last month are pouring in. Your support of the League's efforts to protect our international frequency allocations is both gratifying and humbling; thank you!

Some of the responses come with words of encouragement attached, which mean a lot to us. A few notes follow a somewhat different theme, and there are enough of them that it's worth a moment this month to talk about that theme.

These notes go something like this: "It's fine to talk about defending our frequency allocations at international conferences, but don't you guys ever listen to what's happening on the bands? Our problems are a lot closer to home: nets that are a haven for hate-filled rhetoric, frustrated talk-show hosts, deliberate interference, and every manner of indecency and obscenity. It's bad enough to have to put up with that garbage, but if anyone ever brought a recording of it to an international conference we'd be dead. You'd better do something about it!"

Unfortunately, there's some truth to this. Such problems generally are confined to a few notorious frequencies in a couple of phone bands, but they are visible to an extent that is all out of proportion to the small number of participants.

Such problems also are nothing new. Amateur Radio is not isolated from society as a whole; it never was, and never will be. Technical and operational examinations cannot weed out those who may be prone to antisocial behavior. A letter in June 1935 *QST* complains of on-the-air conduct such as "a fellow thickly describing a drunken party at his home" and the general level of "mumbling immature chitchat," and ends with this warning: "To continue it means certain loss of the remaining privileges and unless 'phone operation improves there is no chance for us to induce the 'powers that be' that we ought to have more rights or fewer restrictions." More recently, the "crisis" of malicious interference was a recurring theme of *QST* editorials in 1980. A lot more examples can be found before, after, and in between. To claim that in 1997 we're suddenly going to hell in a handbasket is clearly an overstatement of the situation.

Even so, it would be irresponsible simply to shrug and say, "The lunatic fringe will always be with us." The ones who step over the line into illegality deserve citations,

fines, or the loss of their licenses, depending on the severity and frequency of the violations. For years we've called for more enforcement action by the FCC, and just six months ago devoted much of this page to an ARRL proposal to improve the Commission's handling of private-sector complaints of malicious interference.

What can we do? Starting with the simplest thing, the League's volunteer Official Observers who function as the Amateur Auxiliary to the FCC's Compliance and Information Bureau deserve a kind word now and then from those of us whose interests they are laboring to protect. If we treat these volunteers, who have neither the responsibility nor the authority to take enforcement actions themselves, as scapegoats for other failures in the system, then we become part of the problem.

More difficult are the fringe operators who are clever enough to stay legal, or at least to stay in the grey area where enforcement action is unlikely. Some of them delight in baiting other amateurs into retaliating with acts that are clearly illegal, and that only make matters worse. All this accomplishes is to reward the provocateurs with the attention they crave while turning the frequency into even more of a social cesspool; if we fall for that, we become our own worst enemy. If you can't listen to provocative stuff without responding in kind or worse, then don't listen. There are lots of other frequencies and modes on which to pursue your healthier interests.

For that matter, why listen to it in the first place? It is vital that we not let the bad drive out the good. If the good guys spend all of their radio time monitoring the fruitcakes, then the latter will be the only ones represented on the bands and we can hardly blame a casual listener for thinking we're *all* like that. Get on the air yourself, elsewhere in the band, and set a positive example for others.

For decades we have contemplated the nightmare scenario of being held hostage at international conferences to recordings of misbehavior in the amateur bands. Other services, including broadcasting, have a similar problem. If attacked in that fashion, we would argue that what was being presented was taken out of context and did not represent the overwhelming majority of Amateur Radio communication, as would the broadcasters on their own behalf. Help the Amateur Service by contributing, through your own operating, to that positive context.—David Sumner, K1ZZ

# We're At Your Service

ARRL Headquarters is open from 8 AM to 5 PM Eastern Time, Monday through Friday, except holidays. Our address is: 225 Main St, Newington, CT 06111-1494. You can call us at 860-594-0200, or fax us at 860-594-0259.

If you have a question, try one of these Headquarters departments . . .

	Contact	Telephone	Electronic Mail
<b>QST Delivery</b>	Circulation Desk	860-594-0338	circulation@arrl.org
<b>Publication Orders</b>	Sales Desk	888-277-5289	pubsales@arrl.org
<b>M-F Only, 9 AM to 9 PM Eastern Time (toll free)</b>			
<b>Regulatory Info</b>	Tom Hogerty	860-594-0323	reginfo@arrl.org
<b>Exams</b>	VEC	860-594-0300	vec@arrl.org
<b>Educational Materials</b>	Educational Activities	860-594-0301	ead@arrl.org
<b>Contests</b>	Billy Lunt	860-594-0252	contest@arrl.org
<b>Technical Questions</b>	ARRL Lab	860-594-0214	tis@arrl.org
<b>Awards</b>	Eileen Sapko	860-594-0288	awards@arrl.org
<b>DXCC/VUCC</b>	Bill Moore	860-594-0234	dxcc@arrl.org
<b>Advertising</b>	Brad Thomas	860-594-0207	ads@arrl.org
<b>Media Relations</b>	Jennifer Gagne	860-594-0328	newsmedia@arrl.org
<b>QSL Service</b>	Martin Cook	860-594-0274	buro@arrl.org
<b>Scholarships</b>	Mary Garcia	860-594-0230	foundation@arrl.org
<b>Emergency Communication</b>	Rick Palm	860-594-0261	k1ce@arrl.org

You can send e-mail to any ARRL Headquarters employee if you know their name or call sign. The second half of every Headquarters e-mail address is **@arrl.org**. To create the first half, simply use the person's call sign. If you don't know their call sign, use the first letter of their first name, followed by their complete last name. For example, to send a message to John Hennessee, N1KB, Regulatory Information Specialist, you could address it to **jennessee@arrl.org** or **N1KB@arrl.org**.

If all else fails, send e-mail to **hq@arrl.org** and it will be routed to the right people or departments.

## ARRL on the On-Line Services

We maintain accounts on these major on-line services and check for mail several times daily.

**Service** **ARRL Address**  
CompuServe 70007,3373  
America Online HQARRL1

Downloadable files for the new ham, upgrader, instructor or disabled ham are featured in the various on-line ham radio file libraries.

## ARRL BBS

The ARRL **Hiram** Bulletin Board System is as close as your telephone. Hiram offers more than a thousand software files for your enjoyment. You can also use Hiram to send

messages to anyone at Headquarters—or to other hams who frequent the BBS. Hiram accepts up to four simultaneous connections at rates from 1200 to 28,800 baud. Fire up your modem and call 860-594-0306.

## Technical Information Server

If you have Internet e-mail capability, you can tap into the ARRL Technical Information Server, otherwise known as the **Info Server**. To have user instructions and a handy index sent to you automatically, simply address an e-mail message to: **info@arrl.org**

Subject: **Info Request**

In the body of your message enter:

**HELP**  
**SEND INDEX**  
**QUIT**

## ARRL on the World Wide Web

You'll also find the ARRL on the World Wide Web at:

<http://www.arrl.org/>

At the ARRL Web page you'll find the latest W1AW bulletins, a hamfest calendar, exam schedules, an on-line ARRL Publications Catalog and much more. We're always adding new features to our Web page, so check it often!

## Stopping by for a visit?

We offer tours of Headquarters and W1AW at 9, 10 and 11 AM, and at 1, 2 and 3 PM, Monday to Friday (except holidays). Special tour times may be arranged in advance. Bring your license and you can operate W1AW anytime between 1 and 4 PM!

ARRL Headquarters is within easy driving distance from Interstates 84 or 91. In addition, Hartford is served by Amtrak, with several trains daily from

New York, Boston and beyond (call 1-800-USA-RAIL for more information). Bradley International Airport in Windsor Locks, Connecticut (about 20 miles north of Headquarters), is served by many major carriers.

## Would you like to write for QST?

We're always looking for new material of interest to hams. Send a self-addressed, stamped envelope (55¢ postage) and ask for a copy of the **Author's Guide**. (It's also available via the ARRL Info Server, and via the World Wide Web at <http://www.arrl.org/qst/guide/>.) The guide contains all the information you'll need to craft an article to meet our requirements. Send article ideas or manuscripts to the attention of the **QST Editor** (e-mail **qst@arrl.org**).

## Press Releases and New Products/Books

Do you have an important news item, or a hot new book or other product? Let us know and we'll tell the world! Send your press releases and new book announcements to the attention of the **QST Editor** (e-mail **qst@arrl.org**). New product announcements should be sent to the **Product Review Editor** (e-mail **reviews@arrl.org**).

## Strays and Up Front

Send your Strays and Up Front materials to the **QST Features Editor** (e-mail **upfront@arrl.org**). Be sure to include your name, address and daytime telephone number.

## Photographs

We can accept black & white or color transparencies, slides or glossy prints. **QST** cannot be responsible for returning these materials, so do not send negatives or irreplaceable originals.

# ARRL Directors

## Atlantic Division

**KAY C. CRAIGIE, W3TP\***  
5 Faggs Manor Ln, Paoli, PA 19301  
(610-993-9623);  
e-mail **w3tp@arrl.org**

**Vice Director:** Bernie Fuller, N3EFN  
17668 Price Rd, Saegertown, PA  
16433 (814-763-1529);  
e-mail **n3efn@arrl.org**

## Central Division

**EDMOND A. METZGER, W9PRN**  
1917 Lindsay Rd, Springfield, IL 62704  
(217-546-6870);  
e-mail **w9prn@arrl.org**

**Vice Director:** Howard S. Huntington,  
K9KM, 25350 N Marilyn Ln, Hawthorn  
Woods, IL 60047 (847-438-3452);  
e-mail **k9km@arrl.org**

## Dakota Division

**TOD OLSON, K0TO**  
292 Heather Ln, Long Lake, MN 55356  
(612-473-6478);  
e-mail **k0to@arrl.org**

**Vice Director:** Hans Brakob, K0HB,  
1610 Weston Ln, Plymouth, MN 55447  
(612-473-6246);  
e-mail **k0hb@arrl.org**

## Delta Division

**RICK RODERICK, K5UR**  
PO Box 1463, Little Rock, AR 72203  
(501-988-2527); e-mail **k5ur@arrl.org**

**Vice Director:** Henry R. Leggette,  
WD4Q, 7335 Ginger Snap Cove,  
Memphis, TN 38125-4732  
(901-757-0444);  
e-mail **wd4q@arrl.org**

\*Executive Committee Member

## Great Lakes Division

**GEORGE E. RACE, WB8BGY**  
3865 Gibbs Rd, Albion, MI 49224  
(517-531-4758);  
e-mail **wb8bgy@arrl.org**

**Vice Director:** Dave Coons, WT8W  
932 Hedwick St, New Carlisle, OH  
45344 (937-849-0604);  
e-mail **wt8w@arrl.org**

## Hudson Division

**FRANK FALLON, N2FF**  
30 E Williston Ave, East Williston,  
NY 11596 (516-746-7652);  
e-mail **n2ff@arrl.org**

**Vice Director:** J. P. Kleinhaus, W2XX  
229 Dirubbo Dr, Cortland Manor, NY  
10566 (914-739-6318);  
e-mail **w2xx@arrl.org**

## Midwest Division

**LEW GORDON, K4VX**  
PO Box 105, Hannibal, MO 63401  
(573-221-7730); e-mail **k4vx@arrl.org**

**Vice Director:** Bruce Frahm, K0BJ,  
PO Box DX, Colby, KS 67701  
(785-462-7388); e-mail **k0bj@arrl.org**

## New England Division

**TOM FRENAYE, K1KI**  
PO Box 386, West Suffield, CT 06093  
(860-668-5444); e-mail **k1ki@arrl.org**

**Vice Director:** Don Haney, KA1T,  
73 Myrick Ln, Harvard, MA

01451-1227 (978-772-4126);  
e-mail **ka1t@arrl.org**

## Rocky Mountain Division

**MARSHALL QUIAT, AG0X**  
PO Box 200878, Denver, CO  
80220-0878 (303-331-3456);  
e-mail **ag0x@arrl.org**

**Vice Director:** Walt Stinson, W0CP,  
999 S Logan St, Denver, CO 80209  
(303-770-3926);  
e-mail **w0cp@arrl.org**

## Northwestern Division

**MARY LOU BROWN, NM7N\***  
504 Channel View Dr, Anacortes, WA  
98221 (360-293-9295);  
e-mail **nm7n@arrl.org**

**Vice Director:** Greg Milnes, W7AGQ,  
740 SE 24th Ave, Hillsboro, OR  
97123-7286 (503-648-6990);  
e-mail **w7agg@arrl.org**

## Pacific Division

**BRAD WYATT, K6WR**  
18400 Overlook Rd, No 5, Los Gatos,  
CA 95030 (408-395-2501);  
e-mail **k6wr@arrl.org**

**Vice Director:** Jim Maxwell, W6CF,  
PO Box 473, Redwood Estates, CA  
95044 (408-353-3911);  
e-mail **w6cf@arrl.org**

## Roanoke Division

**JOHN C. KANODE, N4MM**  
RFD 1, Box 73A, Boyce, VA 22620  
(540-837-1340);  
e-mail **n4mm@arrl.org**

**Vice Director:** Dennis Bodson,  
W4PWF, 233 N Columbus St,  
Arlington, VA 22203 (703-243-3743);  
e-mail **w4pwf@arrl.org**

## Southwestern Division

**FRANK M. BUTLER JR, W4RH\***  
323 Elliott Rd SE, Ft Walton Beach,  
FL 32548 (850-244-5425);  
e-mail **w4rh@arrl.org**

**Vice Director:** Evelyn Gauzens,  
W4WYR, 2780 NW 3rd St, Miami, FL  
33125 (305-642-4139);  
e-mail **w4wyr@arrl.org**

## West Gulf Division

**JIM HAYNIE, W5JBP**  
3226 Newcastle Dr, Dallas, TX 75220  
(214-352-6180; W, 972-247-0123);  
e-mail **w5jbp@arrl.org**

**Vice Director:** Barney Boone, KJ5AE,  
3637 Rialto Way, Grand Prairie, TX  
75052; e-mail **kj5ae@arrl.org**

As an ARRL member, you elect the directors and vice directors who represent your division on ARRL policy matters. If you have a question or comment about League policies, contact your representatives at the addresses shown.

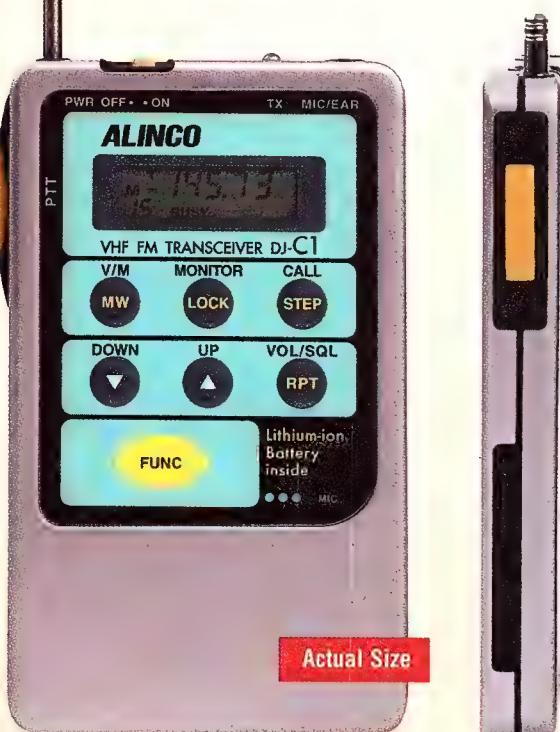
# "Beyond Amazing" Alinco Presents The Mini HT

So slim, it hides in a shirt pocket.

Power to work repeaters many miles away.

Clear, clean audio. 20 Memories plus a Call channel. And a Lithium ion battery that can go 100 hours between charges!

- 20 memories plus Call channel; each memory capable of non-standard splits
- CTCSS encode plus European tone burst
- 300 mW output
- Large capacity internal 500 mAh lithium ion battery
- Earphone/mic port
- Self-storing telescoping antenna
- Includes soft case, earphone, auxiliary wire "pocket" antenna and snap-in battery charger
- Fast 2-hour charging time
- 2.2" wide, 3.7" high, .41" deep



Alinco DJ-C1T 2 Meter (144 MHz) Mini HT

- 144 ~ 147.995 MHz transmit range
- Extended receive 118 ~174 MHz including air band (AM)

Alinco DJ-C4T 70 cm (440 MHz) Mini HT

- 420 ~ 449.995 MHz transmit range



The Alinco DJ-C1T and DJ-C4T represent breakthroughs in mini-radio technology. About the size of a credit card, one can be carried in pocket or purse. With it, you're ready to communicate anytime. Whether you're in business attire or running a marathon, these small, lightweight radios are easy to carry and easier to operate. You'll be amazed at the clean, crisp audio. The lithium ion battery is a revolution in power technology, going as long as 100 hours between charges.

## Accessories Available

- EDS-7 Adaptor Cable for use with speaker mics and headsets
- EDC-36 Mobile charger
- EMS-9Z speaker mic (requires EDS-7)
- EMS-41 speaker mic (requires EDS-7)

Be prepared to answer questions from other hams who see your DJ-C1T or DJ-C4T - even seasoned "veterans" have termed these radios "beyond amazing." The only thing we can add to that, is the low Alinco price!

Simple • Clean • Dependable



**ALINCO**<sup>®</sup>  
AMATEUR RADIO'S VALUE LEADER<sup>SM</sup>

U.S.A. Alinco Branch

438 Amapola Ave. • Suite 130 • Torrance, CA 90501  
Phone: (310) 618-8616 • Fax: (310) 618-8758  
Internet: <http://www.alinco.com>

Specifications subject to change without notice or obligation. Performance specifications only apply to the Amateur bands. Products intended for use only by properly licensed Amateur Radio operators.

# Get to Know Your Section Manager

The 15 divisions of the League are arranged into 70 administrative sections, each headed by an elected *section manager* (SM). Your section manager is the person to contact when you have news about your activities, or those of your club. These news items could find their way into the pages of *QST*! If you need assistance with a local problem, your section manager is your first point of contact. He or she can put you in touch with various ARRL volunteers who can help (such as technical specialists). Your section manager is also the person to see if you'd like to become a section volunteer. Whatever your license class, your SM has an appointment available.

## Atlantic Division

**Delaware**  
**Eastern Pennsylvania**  
**Maryland-DC**  
**Northern New York**  
**Southern New Jersey**  
**Western New York**  
**Western Pennsylvania**

Randall K. Carlson, WB0JJX, 121 Scarborough Park Dr, No 10, Wilmington, DE 19804 (302-655-6179); e-mail [wb0jjx@arrl.org](mailto:wb0jjx@arrl.org)  
Allen R. Breiner Sr, W3TI, 212 Race St, Tamaqua, PA 18252 (717-668-3098)  
William Howard, WB3V, 2304 Snowflake Dr, Odenton, MD 21113 (410-551-6775); e-mail [wb3v@arrl.org](mailto:wb3v@arrl.org)  
Charles Orem, KD2AJ, 3981 RT 22, Plattsburgh, NY 12901 (518-563-6851); e-mail [kd2aj@arrl.org](mailto:kd2aj@arrl.org)  
Jean Priestley, KA2YKN, 7158 Chandler Ave, Pennsauken, NJ 08105 (609-662-3587); e-mail [ka2ykn@arrl.org](mailto:ka2ykn@arrl.org)  
William Thompson, W2MTA, 5460 Rock Rd, Newark Valley, NY 13811 (607-642-8930); e-mail [w2mta@arrl.org](mailto:w2mta@arrl.org)  
Bill Edgar, N3LLR, 22 Jackson Ave, Bradford, PA 16701 (814-362-1250); e-mail [n3llr@arrl.org](mailto:n3llr@arrl.org)

## Central Division

**Illinois**  
**Indiana**  
**Wisconsin**

Bruce Boston, KD9UL, 815 E 3rd St, Beardstown, IL 62618 (217-323-9809); e-mail [kd9ul@arrl.org](mailto:kd9ul@arrl.org)  
Peggy Coulter, W9JUJ, 12330 SCR 200 E, Muncie, IN 47302 (765-288-0481); e-mail [w9juj@arrl.org](mailto:w9juj@arrl.org)  
Roy Pedersen, K9FHI, 510 Park St, Juneau, WI 53039-1243, (920-386-4666); e-mail [k9fhi@arrl.org](mailto:k9fhi@arrl.org)

## Dakota Division

**Minnesota**  
**North Dakota**  
**South Dakota**

Randy "Max" Wendel, N0FKU, 8539 Bryant Ave S, Bloomington, MN 55420-2147 (612-888-5953); e-mail [n0fk@arrl.org](mailto:n0fk@arrl.org)  
Roger "Bill" Kurti, WC0M, Rural Route, Box 34, Rock Lake, ND 58365 (701-266-5646); e-mail [wc0m@arrl.org](mailto:wc0m@arrl.org)  
Roland Cory, W0YMB, 815 2nd Ave W, Mobridge, SD 57601 (605-845-2400)

## Delta Division

**Arkansas**  
**Louisiana**  
**Mississippi**  
**Tennessee**

Roger Gray, N5QS, PO Box 166, Searcy, AR 72145 (501-729-5489); e-mail [n5qs@arrl.org](mailto:n5qs@arrl.org)  
Lionel A. "Al" Oubre, K5DPG, 3011 Sugar Mill Rd, New Iberia, LA 70563-8624 (318-367-3901); e-mail [k5dp@arrl.org](mailto:k5dp@arrl.org)  
Ernest Orman Jr, W5OXA, 15625 Little Joe Rd, Biloxi, MS 39532 (601-392-2816); e-mail [w5oxa@arrl.org](mailto:w5oxa@arrl.org)  
O. D. Keaton, WA4GLS, 141 Medearis Dr, Old Hickory, TN 37138 (615-758-2329); e-mail [wa4gls@arrl.org](mailto:wa4gls@arrl.org)

## Great Lakes Division

**Kentucky**  
**Michigan**  
**Ohio**

Bill Uschan, KC4MIS, 803 Forest Hill Dr, Frankfort, KY 40601 (502-695-1885); e-mail [kc4mis@arrl.org](mailto:kc4mis@arrl.org)  
Richard Mondro, WA4FQT, 800 Dover St, Dearborn Heights, MI 48127 (313-730-2111); e-mail [wa4fqt@arrl.org](mailto:wa4fqt@arrl.org)  
David Kersten, N8AUH, 329 Forest Meadows Dr, Medina, OH 44256 (330-723-7979); packet [n8auh@w8iz.#neoh.oh.usa.net](mailto:n8auh@w8iz.#neoh.oh.usa.net)

## Hudson Division

**Eastern New York**  
**NYC-Long Island**  
**Northern New Jersey**

Robert Leiden, KR2L, 19 Willowbrook Rd, Glenville, NY 12302 (518-399-9343); e-mail [kr2l@arrl.org](mailto:kr2l@arrl.org)  
Leonard Buonaiuto, KE2LE, PO Box 212, Islip Terrace, NY 11752-0212 (516-224-7114); e-mail [ke2le@arrl.org](mailto:ke2le@arrl.org)  
Roy Edwards Sr, AB2RE, 1512 Seventh Ave, Neptune, NJ 07753 (908-774-1650); e-mail [ab2re@arrl.org](mailto:ab2re@arrl.org)

## Midwest Division

**Iowa**  
**Kansas**  
**Missouri**  
**Nebraska**

Jim Lasley, N0JL, PO Box 26, Chillicothe, IA 52548 (515-935-4337); e-mail [n0jl@arrl.org](mailto:n0jl@arrl.org)  
Mike Brungardt, K0TQ, 504 W Broadway St, Newton, KS 67114 (316-283-2535); e-mail [k0tq@arrl.org](mailto:k0tq@arrl.org)  
Roger Volk, K0GOB, 4773 Oakbrier Dr, St Louis, MO 63128 (314-487-4050); e-mail [k0gob@arrl.org](mailto:k0gob@arrl.org)  
Bill McCollum, KE0XQ, 1314 Deer Park Blvd, Omaha, NE 68108 (402-734-3316); e-mail [ke0xq@arrl.org](mailto:ke0xq@arrl.org)

## New England Division

**Connecticut**  
**Eastern Massachusetts**  
**Maine**  
**New Hampshire**  
**Rhode Island**  
**Vermont**  
**Western Massachusetts**

Betsey Doane, K1EIC, 92 Mohegan Rd, Shelton, CT 06484-2448 (203-929-7759); packet [k1eic@n4gaa.ct.usa.noam](mailto:k1eic@n4gaa.ct.usa.noam)  
Lawrence Ober, W1MW, 51 School St, Acton, MA 01720 (508-263-2498); e-mail [w1mw@arrl.org](mailto:w1mw@arrl.org)  
Michelle Mann, W1GU, 645 Main St, Monmouth, ME 04259 (207-933-5060); e-mail [w1gu@arrl.org](mailto:w1gu@arrl.org)  
Alan Shuman, N1FIK, PO Box 119, Goffstown, NH 03045-0119 (603-487-3333); e-mail [n1fik@arrl.org](mailto:n1fik@arrl.org)  
Rick Fairweather, K1KYI, 108 Chaplin St, Pawtucket, RI 02861 (401-725-7507); e-mail [k1kyi@arrl.org](mailto:k1kyi@arrl.org)  
Bernie Capron, N1NDN, RR 1 Box 2086A, Northfield, VT 05663 (802-485-7400); e-mail [n1ndn@arrl.org](mailto:n1ndn@arrl.org)  
William Voedisch, W1UD, 240 Main St, Leominster, MA 01453, (508-537-2502); e-mail [w1ud@arrl.org](mailto:w1ud@arrl.org)

## Northwestern Division

**Alaska**  
**Eastern Washington**  
**Idaho**  
**Montana**  
**Oregon**  
**Western Washington**

Russell Ely, WL7LP, 1004 Sirlin Dr, North Pole 99705 (907-488-7388); e-mail [wl7lp@arrl.org](mailto:wl7lp@arrl.org)  
Kyle Pugh, KA7CSF, W 5006 Houston Ave, Spokane, WA 99208 (509-327-5039); e-mail [ka7csp@arrl.org](mailto:ka7csp@arrl.org)  
Mike Langrell, AA7VR, 3629 E Clement Dr, Boise, ID 83704 (208-375-7003); e-mail [aa7vr@arrl.org](mailto:aa7vr@arrl.org)  
Darrell Thomas, N7KOR, 743 33rd Ave NE, Great Falls, MT 59404 (406-453-8574); e-mail [n7kor@arrl.org](mailto:n7kor@arrl.org)  
Randy Stimson, KZ7T, 9890 SW Inglewood St, Portland, OR 97225 (503-297-1175); e-mail [kz7t@arrl.org](mailto:kz7t@arrl.org)  
Harry Lewis, W7JWJ, 10352 Sand Point Way NE, Seattle, WA 98125 (206-523-9117); e-mail [w7jwj@arrl.org](mailto:w7jwj@arrl.org)

## Pacific Division

**East Bay**  
**Nevada**  
**Pacific**  
**Sacramento Valley**  
**San Francisco**  
**San Joaquin Valley**  
**Santa Clara Valley**

Bob Vallio, W6RGG, 18655 Sheffield Rd, Castro Valley, CA 94546 (510-537-6704); e-mail [w6rgg@arrl.org](mailto:w6rgg@arrl.org)  
Robert Davis, K7TY, 1765 Dickerson Rd, Reno, NV 89503 (702-856-2826); e-mail [k7ty@arrl.org](mailto:k7ty@arrl.org)  
Dean W. Manley, KH6B, 2058 Ainaola Dr, Hilo, HI 96720-3638 (808-959-8257); e-mail [kh6b@arrl.org](mailto:kh6b@arrl.org)  
Jettie Hill, W6RFF, 306 St Charles Ct, Roseville, CA 95661 (916-783-0383); e-mail [w6rff@arrl.org](mailto:w6rff@arrl.org)  
John Wallack, W6TLK, PO Box 1115, Kenwood, CA 95452 (707-833-1873); e-mail [w6tlk@arrl.org](mailto:w6tlk@arrl.org)  
Donald Costello, W7WN, 1900 N Ashby Rd, No. 9, Merced, CA 95348 (209-383-5739); e-mail [w7wn@arrl.org](mailto:w7wn@arrl.org)  
Kit Blanke, WA6PWW, 304 Sylvia Ave, Milpitas, CA 95035 (408-263-8944); e-mail [wa6pww@arrl.org](mailto:wa6pww@arrl.org)

## Roanoke Division

**North Carolina**  
**South Carolina**  
**Virginia**  
**West Virginia**

W. Reed Whitten, AB4W, 1208 Oxford Pl, Cary, NC 27511 (919-467-7464); e-mail [ab4w@arrl.org](mailto:ab4w@arrl.org)  
Leslie Shattuck, K4NKK, 112 Park Circle, Greenville, SC 29605 (864-442-8859); e-mail [k4nk@arrl.org](mailto:k4nk@arrl.org)  
Chris Wright, KD4TZN, 872 W Franklin St, Rocky Mount, VA 24151 (540-489-5472); e-mail [kd4tzn@arrl.org](mailto:kd4tzn@arrl.org)  
O. N. (Olie) Rinehart, WD8V, 1256 Ridge Dr, South Charleston, WV 25309-2434 (304-768-9534); e-mail [wd8v@arrl.org](mailto:wd8v@arrl.org)

## Rocky Mountain Division

**Colorado**  
**New Mexico**  
**Utah**  
**Wyoming**

Tim Armagost, WB0TUB, 6337 S Lafayette Pl, Littleton, CO 80121 (303-795-9683); e-mail [wb0tub@arrl.org](mailto:wb0tub@arrl.org)  
Joe Knight, W5PDY, 10408 Snow Heights Blvd NE, Albuquerque, NM 87112 (505-299-4581); e-mail [w5pdy@arrl.org](mailto:w5pdy@arrl.org)  
Jim Rudnicki, NZ7T, 306 North 1500 East, Layton, UT 84040 (801-547-9218); e-mail [nz7t@arrl.org](mailto:nz7t@arrl.org)  
Robert Williams, N7LKH, PO Box 130, Wapiti, WY 82450 (307-527-7758); e-mail [n7lkh@arrl.org](mailto:n7lkh@arrl.org)

## Southeastern Division

**Alabama**  
**Georgia**  
**Northern Florida**  
**Southern Florida**  
**Puerto Rico**  
**Virgin Islands**

Tom Moore Jr, KL7Q, 216 Lee Rd, No 343, Salem, AL 36874 (334-745-0962); e-mail [kl7q@arrl.org](mailto:kl7q@arrl.org)  
Sandy Donahue, W4RU, 960 Ralph McGill Blvd, Atlanta, GA 30306 (404-744-9095); e-mail [w4ru@arrl.org](mailto:w4ru@arrl.org)  
Rudy Hubbard, WA4PUP, PO Box 843, Milton, FL 32572-0843 (850-626-0620); e-mail [wa4pup@arrl.org](mailto:wa4pup@arrl.org)  
Robert (Rip) Van Winkle, AA4HT, 1413 Covey Cir S, Lakeland, FL 33809 (941-853-1400); e-mail [aa4ht@arrl.org](mailto:aa4ht@arrl.org)  
Guillermo Schwarz, KP3S, HC-03 Box 7526, Guayanabo, PR 00971 (787-720-8137); e-mail [kp3s@arrl.org](mailto:kp3s@arrl.org)  
John Ellis, NP2B, PO Box 24492, Christiansted, St Croix, VI 00824 (809-773-9643); e-mail [np2b@arrl.org](mailto:np2b@arrl.org)

## Southwestern Division

**Arizona**  
**Los Angeles**  
**Orange**  
**San Diego**  
**Santa Barbara**

Clifford Hauser, KD6XH, 8741 N Hollybrook Ave, Tucson, AZ 85742 (520-744-9095); e-mail [kd6xh@arrl.org](mailto:kd6xh@arrl.org)  
Phineas J. Icenbice Jr, W6BF, 19323 Halsted St, Northridge, CA 91324 (818-349-3186); e-mail [w6bf@arrl.org](mailto:w6bf@arrl.org)  
Joe H. Brown, W6UBQ, 5444 La Sierra, Riverside, CA 92505 (909-687-8394); e-mail [w6ubq@arrl.org](mailto:w6ubq@arrl.org)  
Patrick Bunsold, WA6MHZ, 14291 Rios Canyon Rd, No 33, El Cajon, CA 92021 (619-561-0052); packet [wa6mhz@wa6bgs.#soca.ca.usa.noam](mailto:wa6mhz@wa6bgs.#soca.ca.usa.noam)  
Robert Griffin, K6YR, 1436 Johnson Ave, San Luis Obispo, CA 93401-3734 (805-543-3346); e-mail [k6yr@arrl.org](mailto:k6yr@arrl.org)

## West Gulf Division

**North Texas**  
**Oklahoma**  
**South Texas**  
**West Texas**

Robert Adler, N5NY, 507 San Juan Dr, Southlake, TX 76092 (800-376-9933/817-329-0820); e-mail [n5ny@arrl.org](mailto:n5ny@arrl.org)

Coy C. Day, N5OK, RR 1 Box 254, Union City, OK 73090-9726 (405-483-5632); e-mail [n5ok@arrl.org](mailto:n5ok@arrl.org)

E. Ray Taylor, N5NAV, 688 Comal Ave., New Braunfels, TX 78130 (830-625-1683); e-mail [n5nav@arrl.org](mailto:n5nav@arrl.org)

Amelia "Milly" Wise, W5OVH, 8516 Mt Scott, El Paso, TX 79904 (915-751-4160)

# AT-600

## COMPLETE DUALBAND PERFORMANCE AT A GREAT PRICE

Win FREE ADI  
equipment by visiting  
[www.adi-radio.com](http://www.adi-radio.com)

*All of the features you want,  
at a price anyone can afford.*

- ◆ Tx: 144 - 148 and 430 - 450 MHz
- ◆ Rx: 108 - 174, 400 - 470, and  
900 - 985 MHz
- ◆ FM and AM aircraft
- ◆ True dualband radio!
- ◆ Simultaneous VHF / UHF receive
- ◆ 200 memory channels
- ◆ Crossband repeater mode
- ◆ Alphanumeric display
- ◆ CTCSS encode / decode
- ◆ DTMF encode / decode
- ◆ CTCSS tone scan
- ◆ Wireless cloning
- ◆ 10 DTMF autodialer memories
- ◆ Auto power off and battery save
- ◆ Battery voltage meter
- ◆ PC programmable
- ◆ Full-sized backlit keypad
- ◆ 2.5 or 5 watt versions available
- ◆ MARS / CAP capable

\$30  
Coupon

See dealer for details  
Offer good til 12/31/97



PREMIER  
communications

20277 Valley Blvd., #J, Walnut, CA 91789 TEL: 909-869-5711 FAX: 909-869-5710 e-mail: [premier@adi-radio.com](mailto:premier@adi-radio.com) www: <http://www.adi-radio.com>

# AMERITRON... 800 Watts... \$795

Ameritron AL-811H gives you four 811A tubes, 800 watts, superior quality -- for less money -- than the competitor's 3 tube 600 watt unit... Why settle for less power, less quality and pay more money?



AL-811H

**\$795**

Suggested Retail

AL-811

**\$649**

Suggested Retail

Only the Ameritron AL-811H gives you four fully neutralized 811A transmitting tubes. You get absolute stability and superb performance on higher bands that can't be matched by un-neutralized tubes.

Ameritron mounts the 811A tubes vertically -- not horizontally -- to prevent hot tube elements from sagging and shorting out. Others, using potentially damaging horizontal mounting, require special 811A tubes to retard sagging and shorting.

A quiet, powerful computer grade blower draws in

plenty of cool air. It pressurizes the cabinet and efficiently cools your 811A tubes. Our air flow is so quiet, you'll hardly know it's there -- unlike noisy, poorly chosen blowers.

You also get efficient full size heavy duty tank coils, full height computer grade capacitors, heavy duty high silicon core power transformer, slug tuned input coils, operate/standby switch, transmit LED, ALC, dual meters, QSK compatibility with QSK-5 plus much more.

AL-811 has three 811A tubes and gives 600 Watts output for only \$649.

## Kilowatt AL-80B doubles average SSB power



AL-80B

**\$1249**

Suggested Retail

The AL-80B kilowatt desktop linear can double your average SSB power output with high-level RF processing -- runs cooler because its 3-500 completely turns off between words. It saves hundreds of watts wasted as heat.

You get a full kilowatt PEP output from a whisper quiet desktop linear. It's a compact 8 1/2x14x15 1/2 inches and plugs into your nearest 120 VAC wall outlet. Covers all bands 160-15 Meters, including WARC and MARS bands.

You get 1000 watts output on SSB, 850 watts output on CW, 500 watts output on RTTY, an extra heavy duty power supply, 3-500 tube, nearly 70% efficiency, tuned input, Pi/Pi-L output, inrush current protection, multi-voltage transformer, dual Cross-Needle meters, QSK compatibility, Two-Year Warranty, and much, much more! Made in U.S.A.

### AMERITRON HF Linear Amps with Eimac™ 3CX800A7

AL-800H  
**\$2295**

Two tubes  
1500 Watts plus

AMERITRON's new AL-800/H amps cover 160-15 Meters including WARC bands. The AL-800 has a single Eimac™ 3CX800A7 tube and produces 1250 Watts PEP. The AL-800H has two 3CX800A7s giving 1500 Watts plus.

Both amps have an adjustable slug tuned

Suggested Retail  
Call your dealer for  
your best price!

AL-800  
**\$1595**

Single tube  
1250 Watts

input circuit, grid protection, ALC control that is front panel adjustable, vernier reduction drives, heavy duty 32 pound grain oriented silicone steel core transformers and high capacitance computer grade filter capacitors.

These amplifiers have multi-voltage operation (14 user selectable AC line voltage from 90-140; 200-250 VAC), quiet pressurized ventilation systems, dual illuminated Cross-Needle meters that read peak forward and reflected power, SWR, high voltage, grid current and plate current.

Vernier reduction drives make tuning adjustments smooth and easy. Ameritron's exclusive Step-Start Inrush Protection™ stops damage to your amplifier from inrush current. Ameritron amps feature an attractive Lexan front panel decal and superior, all metal construction -- it's built to last! Ultra compact desktop size is perfect for your operating station. 8 1/2x16 1/2x14 1/4".

**\$2695**

Suggested Retail

AL-1500

with Eimac® 8877 ceramic tube

**\$2695**

Suggested Retail

Ameritron's most powerful amplifier uses the herculean Eimac® 8877 ceramic tube. It's so powerful that 65 watts drive gives you the full legal output -- and it's just loafing because the power supply is capable of 2500 Watts PEP.

**Ameritron's toughest legal limit Amp**

AL-1200

with Eimac® 3CX1200A7 tube

**\$2195**

Suggested Retail

AL-1200

with Eimac® 3CX1200A7 tube

**\$2195**

Suggested Retail

Get ham radio's toughest tube with the Ameritron AL-1200 -- the Eimac 3CX1200A7. It has a 50 watt control grid dissipation. What makes the Ameritron AL-1200 stand out from other legal limit amplifiers? The answer: A super heavy duty power supply that loaf's at full legal power -- it can deliver the power of more than 2500 watts PEP two tone output for a half hour.

**Ameritron's most for your money legal limit linear amp with a pair of 3-500Z tubes**

AL-82

**\$2195**

Suggested Retail

AL-82

**\$2195**

Suggested Retail

This linear gives you full legal output using a pair of 3-500s. Most competing linears using 3-500s can't give you 1500 watts because their lightweight power supplies can't use these tubes to their full potential.

## AMERITRON no tune Solid State Amplifiers

Ameritron ALS-500M Mobile no tune Solid State Amp has 500W out, covers 1.5-22 MHz

ALS-500M Ideal

**\$799**

Suggested Retail  
Mobile amplifier  
-- uses

13.8 Vdc mobile electrical system, very compact 3 1/2x9x15 in., extremely quiet, 500W output, 1.5-22 MHz coverage, instant bandswitching, no tuning, no warm up, no tubes, SWR protected.

Ameritron ALS-600 no tune Solid State FET amp includes heavy duty power supply, 600 Watts out

ALS-600

**\$1299**

Suggested Retail  
Includes AC

power supply, 600 W output, continuous 1.5-22 MHz coverage, instant bandswitching, fully SWR protected, extremely quiet, very compact. Amp is 6x9 1/2x12 inches.

No tuning, no fuss, no worries -- just turn it on and operate.

Includes AC

**\$1299**

Suggested Retail

ALS-600

**\$1299**

Suggested Retail

This linear gives you full legal output using a pair of 3-500s. Most competing linears using 3-500s can't give you 1500 watts because their lightweight power supplies can't use these tubes to their full potential.

## AMERITRON brings you the finest high power accessories!

ARB-700 amp-to-radio  
interface... \$29.95

QSK-5 Pin Diode T/R  
Switch... \$349

Protects your costly transceiver

from damage by keying line transients, steady state current and excessive voltages.

Self-contained, connects externally to most HF amps.

Handles 2.5 KW PEP, 2 KW CW. Six times faster than vacuum relay. 6x4x9 1/2 in.

**More hams use AMERITRON amps than any other in the world!**

Why? AMERITRON has earned a worldwide reputation for legendary quality, flawless performance, proven reliability and superb customer service... Call your favorite dealer for your best price and quick delivery!

**Free Catalog/Nearest Dealer**

Write or call 800-647-1800

**AMERITRON**®

*... the high power specialists*

AMERITRON, 116 Willow Road, Starkville, MS 39759

TECH (601) 323-8211 • FAX (601) 323-6551

8 a.m. - 4:30 p.m. CST Monday - Friday

For high power amplifier components, call (601)-323-8211

Web Site... <http://www.ameritron.com>

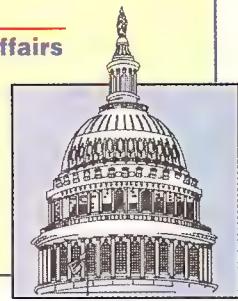
*Call your favorite dealer for your best price!*

# DC Currents

By Steve Mansfield, N1MZA

Manager, Legislative and Public Affairs

Just as radio waves aren't constrained by artificial boundaries, neither is ARRL's government relations effort. "DC Currents" covers behind-the-scenes activity you need to know about in Congress, at the FCC and other regulatory agencies, as well as at worldwide bodies such as the International Telecommunication Union.



## Tauzin Says "We Hear You" To Amateurs, Scanner Fans

♦ HR 2369, the Wireless Privacy Enhancement Act, has been rewritten to reflect the concerns of Amateur Radio operators, volunteer firefighters, scanner enthusiasts and others. The ARRL worked with a coalition of other organizations to make sure your voice was heard on The Hill.

The bill was fixed in House Telecommunications Subcommittee markup October 29. In an opening statement, Chairman W.J. "Billy" Tauzin said he had intended "to protect users of wireless services that pay for such services ..." (i.e. cellular and PCS). But the original bill went well beyond protecting those services and, at least arguably, could have outlawed some traditional scanning activities, as well as affecting amateur out-of-band equipment. ARRL and others objected. Many meetings, phone calls and letters with Tauzin's staff followed the introduction of the original bill. The fruits of our efforts were revealed at markup when a better substitute bill was introduced restricting the scanner ban to cellular and PCS frequencies.

Mr. Tauzin noted our concerns. "The bill was never intended to prohibit the scanning of public safety frequencies or other noncommercial frequencies in which users have no expectation of privacy," he said.

"I have worked closely with the public safety community, amateur radio operators, and scanner manufacturers...many of their concerns raise legitimate, socially beneficial goals...I thank their representatives for working so constructively with this Committee in order to articulate the goals of enhancing the security of private communications without threatening legitimate users of scanners."

One of the bill's original cosponsors, Rep. Anna Eshoo (D-CA-14th) praised Mr. Tauzin for listening to Amateur Radio concerns. So did Rep. Ron Klink (D-PA-4th), while noting that the bill's requirement that FCC investigate and act upon complaints about privacy violations could be a problem, given FCC's enforcement track record. Klink said he worried about adding to the Commission's workload without providing further resources.

The next step for the bill will be the full Commerce Committee. ARRL will continue to work with committee staff to fine-tune one of the bill's provisions that could have unintended consequences with regard to unrelated modifications of equipment.

On the whole, it looks like Congress has listened. It is still too early to say whether the bill in its modified form, or in any other form, will ever become law.

## Amateur Radio Gets TV, Radio News Coverage

♦ A key ARRL objective is to ensure that Amateur Radio gets plenty of positive news media coverage. So, in addition to working with national media on story development, we also prepare regular information packets for our PIC/PIO network to use with local news media. Does it work? Consider: every month ARRL receives dozens of stories about Amateur Radio that our clipping service culls from newspapers in the US with circulation over 10,000. We also receive many more clippings that members find in their local papers and mail to us. Is ARRL responsible for this outstanding coverage? We'd like to think we play some part in it. But we're the first to admit that the real origin of these stories is the continuing fascination Amateur Radio itself holds for ordinary people with an interest in technology. Of course, there is also the willingness of amateurs around the country to share their enthusiasm with the news media. The work hard, and it shows!

Recently, we began to wonder if the electronic media was paying as much attention as newspapers. We asked a video monitoring service to prepare a report of more-than- incidental mentions they could find for a period of six weeks beginning September 1. Here's what they found:

- Discovery Channel "Beyond 2000": piece on Amateur Radio, Sept. 8;
- WUSA-TV (CBS, Washington): coverage of Gaithersburg, MD hamfest, Sept. 8;
- CNN "Showbiz Today": Amateur Radio traffic handling behind the scenes at the Miss America Pageant, Sept. 12;
- CNN "Headline News": repeat of Miss America segment, Sept. 12;
- KTVT-TV (CBS, Dallas): neighbors upset about ham antenna, Sept. 12;
- KNWS-TV (Ind, Houston): picks up CNN Miss America story, Sept. 12;
- WABC-TV (ABC, New York City): local Amateur Radio club meets with Mayor Giuliani to celebrate Amateur Radio Day, Sept. 19;
- KABC-TV(ABC, Los Angeles): Amateur Radio operators involved in volunteer Fire Watch project, Sept. 19;
- KPHO-TV(CBS, Phoenix): Amateur Radio setup for kids at the Arizona Science Center, Sept. 25;

- WESH-TV(NBC, Orlando): Shriners ham radio swap meet, W3UNM talks about use of ham radio, Oct. 4;
- KFWB-AM Radio (Ind. Los Angeles): Amateur Operator communication involved in Hurricane Pauline recovery activities in Mexico, Oct. 9;
- KNX-AM Radio (CBS, Los Angeles): Amateur Operator communication involved in Hurricane Pauline recovery activities in Mexico, Oct. 9;
- KNSD-TV(NBC, San Diego): Amateur Operator communication involved in Hurricane Pauline recovery activities in Mexico, Oct. 9;

For the month of September, we received 51 clips from daily newspapers (above 10,000 circulation) on Amateur Radio and 10 from weekly papers. So when somebody tells you "Amateur Radio never gets any news coverage," don't you believe it! What thread do these stories have in common? Not one is about "ham radio" in general. Rather, they're always about ham radio *doing* something interesting. So get busy. And then tell your local reporter about it!

## New FCC Commissioners Headed for Senate Confirmation

• The White House Nominees for the revamped Federal Communications Commission had their "day in court" in October when the Senate Commerce Committee held hearings to determine their suitability. As you read this, it is likely that the Senate will have confirmed all of the candidates. They include William E. Kennard, Harold W. Furchtgott-Roth, Michael Powell, and Gloria Tristani. Susan Ness, whose appointment expires in 1999 is the sole holdover. FCC Commissioners serve 5 year terms. Senators Jesse Helms (R-NC), John Ashcroft (R-MO) and Ted Stevens (R-AK) had made rumblings about blocking Kennard's appointment, and Senator Kay Bailey Hutchinson (R-TX) had expressed reservations about Tristani. But all three Senators eventually gave the nominations their blessing.

# 1997 Session Ends with Whimpers and Bangs in Washington

As we went to press, the sound and fury in Washington was winding down for the season. Members of Congress packed their bags to head home until January, and FCC appointees waited in the wings eager to try out their brand new chairs. Congress will return to a full slate of legislation placed on the table in 1997. More than 3500 measures were introduced in the House of Representatives and 2700 in the Senate. But so far, the going has been slow. Congress has enacted

and the President has signed just 49 pieces of new legislation, so 1998 is apt to be hectic.

During 1997, Congress tackled the largest, most time consuming issues, including appropriations and authorization bills, the balanced budget, and campaign finance reform. Telecommunications issues have not been on the front burner. But, the House Telecommunications Subcommittee and the Senate Communications Subcommittee have

had hearings on cellular telephone privacy, spectrum management policy, the WTO telecommunications agreement, NTIA reauthorization and television rating guidelines. There are plenty of telecommunication bills "in the hopper" should the committees decide to turn their attention to these issues. In 1997, ARRL visited about 200 Congressional offices in addition to monitoring hearings, markups and other special Congressional events.

## Telecommunications Bills, 105th Congress, First Session

Here is a summary of significant telecommunications legislation introduced during the first half of the 105th Congress. We have removed from the list bills with only incidental references to telecommunications issues. To get a current status report on any of these bills, go to <http://thomas.loc.gov> on the World Wide Web.

### *House of Representatives*

**HR 84** To require broadcasters to provide free time for political advertising.

**HR 121** To repeal statutory authority for Corporation for Public Broadcasting.

**HR 147** To direct FCC to establish ethnic and minority affairs section.

**HR 280** To require FCC to implement recommendations on universal service support (advanced telecommunications) for schools and libraries.

**HR 369** To require FCC to prescribe rules to protect public safety by preventing broadcasts that create hazards for motorists.

**HR 486** To promote greater telecommunications and information services to Native Americans.

**HR 555** Variation on HR 486.

**HR 695** To relax export controls on encryption technology and prohibit mandatory key escrow.

**HR 910** To require violent TV programs be broadcast after hours when children comprise substantial portion of audience, unless rated on violent content so as to be blockable by electronic means.

**HR 1013** To put Amateur Radio VEs and OOs under the protection of the Federal Tort Claims Act.

**HR 1017** To require FCC to establish toll free telephone number and computer site for collection of complaints.

**HR 1054** To establish national policy against state and local interference with interstate commerce on the Internet.

**HR 1067** To prohibit the advertising of distilled spirits on radio and television.

**HR 1180** To require Internet providers to provide screening software that permits parents to control Internet access.

**HR 1287** To regulate use by interactive computer services of Social Security numbers and related personal information.

**HR 1324** To clarify authority of FCC to authorize foreign investment in US broadcast and common carrier licenses.

**HR 1367** To prohibit Federal agencies from making available through the Internet certain confidential records with respect to individuals.

**HR 1539** To require the FCC to preserve low-power television stations that provide community broadcasting.

**HR 1626** To require the licensing of unused channels in the 152-159 and 470-512 MHz bands for public safety uses.

**HR 1964** To increase scope of prohibitions against cellular and other "scanner eavesdropping." See HR 2369 for another version of bill (see, also, September 1997 "DC Currents").

**HR 2369** Enlarges prohibitions against cellular eavesdropping to include listening to CMRS frequencies, and proposes stiffer penalties for listening to or disclosing the contents of certain transmissions (see October and November 1997 "DC Currents").

**HR 2383**, To authorize enforcement by state and local governments of certain FCC regulations regarding use of citizen band radio equipment.

**HR 2400** To provide funding for highways and other surface transpor-

tation, and includes provision for designating spectrum for "Intelligent Transportation System," most likely in the 5 GHz range.

**H RES 29** To express intentions of House of Representatives concerning the universal service provisions of Telecommunications Act of 1996 as they relate to telecommunications services to Native Americans.

### *Senate*

**S 11** To reform Federal election campaign (including broadcast campaign advertising).

**S 12** To improve education for 21st Century (development of technology skills).

**S 59** To terminate Extremely Low Frequency Communication System of Navy.

**S 95** To provide for Federal campaign finance reform, (including broadcast campaign advertising).

**S 213** To repeal amendments on obscene and harassing use of telecommunications facilities made by Communications Decency Act of 1996 and to restore provisions in effect before the enactment of the act.

**S 255** To provide for the reallocation and auction of portion of electromagnetic spectrum (from TV channels) to enhance law enforcement and public safety telecommunications.

**S 363** To limit violent TV broadcasts to hours after which children comprise substantial portion of audience, unless rated on violent content so blockable by electronic means.

**S 376** To affirm right to use and sell encryption products and to establish privacy standards for voluntary key recovery encryption systems.

**S 377** To promote electronic commerce by facilitating the use of strong encryption.

**S 385** To provide reimbursement under the Medicare program for "telehealth" services.

**S 407** To clarify authority of FCC to authorize foreign investment in US broadcast and common carrier licenses.

**S 493** To amend criminal code to outlaw cellular telephone cloning paraphernalia.

**S 608** To authorize enforcement by state and local governments of FCC regulation of illegal citizen band radio equipment.

**S 641** To require FCC to eliminate regulations restricting cross-ownership of broadcasting facilities.

**S 663** To enhance taxpayer value in auctions conducted by the FCC.

**S 665** To monitor the progress of the Telecommunications Act of 1996.

**S 705** To establish statutory rules for conversion of TV from analog to digital transmission.

**S 741** To enable FCC to enhance spectrum management capabilities through lease fees and to enhance public safety radio.

**S 1173** Companion bill to HR 2400, this "Intermodal Surface Transportation Efficiency Act," or ISTEA, contains provisions for radio links for "intelligent highway" system.

**S RES 86** Sense of Senate on Internet telephone access charges and growth of advanced interactive communication networks.

Ultra Compact Dual Band Handheld

FT-50RD

# One tough little dual bander!

## Features

- Frequency Coverage  
Wide Band Receive  
RX: 76-200 MHz, 300-540  
MHz, 590-999 MHz\*
- TX: 144-148 MHz,  
430-450 MHz
- AM Aircraft Receive
- MIL-STD 810 Rating
- Digital Coded Squelch (DCS)
- 112 Memory Channels
- 12V DC Direct Input
- High Speed Scanning
- Alphanumeric Display
- CTCSS Encode/Decode
- Auto Range Transpond  
System™ (ARTS™)
- Dual Watch
- Direct FM
- High Audio Output
- ADMS-1C Windows™  
PC Programmable
- Four Battery Savers:  
Automatic Power-Off (APO)  
Receive Battery Saver (RBS)  
Selectable Power Output (SPO)  
Transmit Battery Saver (TBS)
- Time Out Timer (TOT)
- 2.5 and 5 Watt Versions  
Available
- Built-in Digital Voice Recording  
System (DVRS)
- Full line of accessories

NOW  
WITH BUILT-IN  
DELUXE  
KEYPAD



"You notice how loud this HT's audio is?"

"Yeah, it's Mil Spec tough like a commercial HT."

"Easy to operate, small, great price!"

"Yaesu did it again!"

The foremost in top-performing, durable, dual band handhelds now includes the FT-12 DTMF keypad with CTCSS enc/dec, DCS enc/dec, DVRS and paging/coded squelch. Manufactured to rigid commercial grade standards, the FT-50RD is the only amateur dual band HT to achieve a MIL-STD 810 rating. Already a winner; the deluxe keypad makes this stand-out HT even better! Water-resistant construction uses weather-proof gaskets to seal major internal components against the corrosive action of dust and moisture. And, the rugged FT-50RD withstands shock and vibration, so throw it in with your gear!

Exclusive features set the FT-50RD apart, too. Wide Band Receive includes 76-200 MHz (VHF), 300-540 (UHF), and 590-999 MHz\*. Dual Watch checks sub-band activity while receiving on another frequency, then when a signal is detected, shifts operation to

that frequency. Digital Battery Voltage displays current operating battery voltage. Digital Coded Squelch (DCS) silently monitors busy channels. Auto Range Transpond System™ (ARTS™) uses DCS to allow two radios to track one another. And, the FT-50RD is ADMS-1C Windows™ PC programming compatible, too. To round out the FT-50RD, it has four battery savers, and super loud audio—remarkable in an HT this size.

A reliable companion where ever you go, the FT-50RD is one tough little dual bander with all the features you want!

# YAESU

...leading the way.™

For the latest Yaesu news; hottest products, visit us on the Internet! <http://www.yaesu.com>



FT-10/40R

Ultra Compact Handhelds

VHF or UHF. Similar to FT-50RD including MIL-STD 810, and other exclusive features.

"The quick-release remote front panel gives you so many installation options."

"And with dual receive you can talk on one band, and listen on another!"



"Plus, the high-tech Enhanced Smart Search™ is great for finding repeaters --and you can watch it all on the dual display."

"Looks like Yaesu did it again!"

# FT-8100R

Compact Dual Band Mobile

## Now a dual-bander that remotes and is easy-to-use, without sacrificing the features you want!

With its quick-release, remote front panel system, the FT-8100R combines high-performance dual-band features in a simple-to-operate rugged mobile built to the endurance standards of commercial radios. The result is installation flexibility and industry-first, "must-have" advantages!

Use dual receive (V+V, U+U or V+U), or talk on one band while listening on another. Watch Yaesu's exclusive Enhanced Smart Search™ automatically seek out and load active frequencies--great for finding new repeaters while traveling.

Get wide receive coverage--from 110 to 550 MHz and 750 to 1300 MHz\* for public safety, marine, aircraft, and weather channels. Enjoy up to 50 Watts of VHF power output (35 Watts on UHF) with High/Medium/Low choice on each band, and "plug and play" 1200 or 9600 bps packet. Utilize 208 memory channels--the greatest available on any remote mobile--to store repeater offset, CTCSS tone, packet baud rate, and power level.

Yaesu's popular Omni-Glow™ display provides a wide field of view, and includes a DC voltage meter. Quickly program, or clone frequency memories with optional Windows™ PC programmable ADMS-2D.

"User-friendly" describes the streamlined front panel layout. Eight clearly-marked keys, and separate Volume/Squelch controls for each band, make operation easy. And the backlit DTMF microphone includes 3 user-programmable keys...but no awkward keypad cover!

Don't sacrifice high-performance features in your dual-band mobile installation. Get the easy-to-use FT-8100R at your Yaesu dealer now!

**YAESU**  
...leading the way.™

For the latest Yaesu news, hottest products: visit us on the internet! <http://www.yaesu.com>

### Features

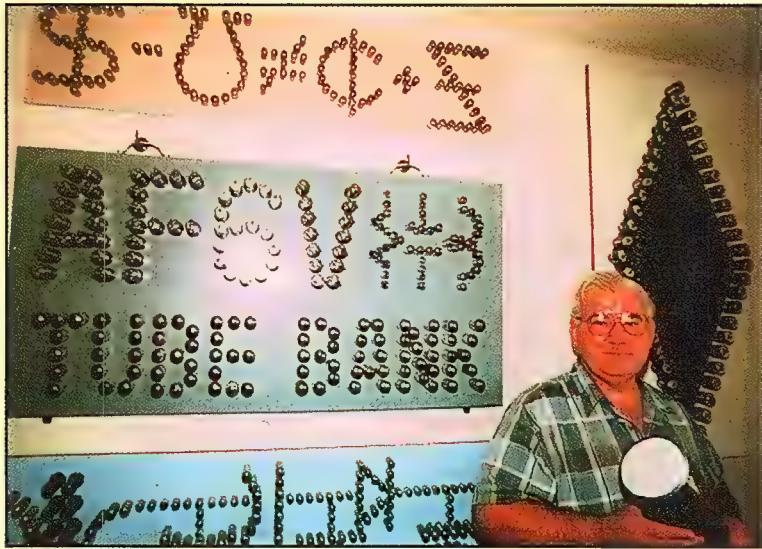
- Frequency Coverage  
RX: 110~550 MHz  
750~1300 MHz\*  
TX: 144~148 MHz  
430~450 MHz
- Detachable Front Panel  
(removable w/optional YSK-8100)
- 3 Power Output Levels  
2m 50/20/5 Watt  
70cm 35/20/5 Watt
- 208 Memory Channels
- Enhanced Smart Search™
- CTCSS Encode
- Built-in Duplexer
- S-Meter Squelch
- Dual Receive (V+V,U+U,V+U)
- Crossband Repeat  
(bidirectional or one-way)
- PC Programmable w/optional ADMS-2D
- Digital Battery Voltage Display
- Auto Power Off (APO)
- Omni-Glow™ Display
- 1200/9600 bps Packet Compatible
- Alternating-Band Memory Selection (ABMS)
- DTMF Autodialer (6 Memories)
- Time Out Timer (TOT)
- Accessories: Consult your local Yaesu dealer.

\*Cellular & 900 MHz Cordless Phone frequencies blocked.



# Up Front in

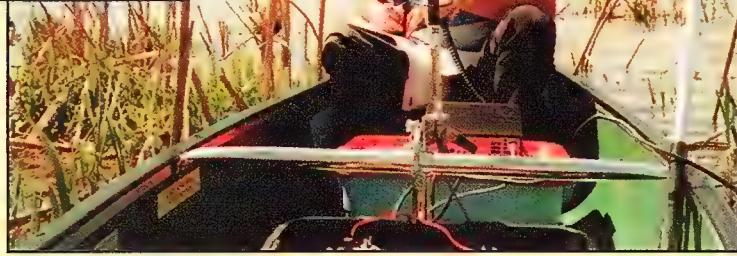
**QST**



**Tubes, tubes, tubes, wonderful tubes!** (Any similarity to a Monty Python skit is purely intentional.) Bob Wentworth, AF6V, has about 30,000 working firebottles that he is making available free to hams who can use them. You only have to pay \$5 for shipping. Send Bob a self-addressed, stamped envelope and ask if he has the tube you're looking for. His address is: 4804 Huron Ave, San Diego, CA 92117-6211.



**Another day, another island.** John Reisenauer, NL7TB, is an active QRP enthusiast and tireless promoter of the US Islands Awards program. When the weather is decent—and even when it isn't—you'll find him on the air from *somewhere*—typically an island in the US or Canada. Earlier this year John worked "canoe mobile" from several islands (right). He also operated as VE7USI from remote Caribou Island (above). With enough bug spray, you can go anywhere!



**Even in Korean, it means the same.** Joe Preski, KG6KH, occasionally travels to Ulsan, Korea on assignment for his employer, the Hyundai company. Joe's friend Doc, WE6A, asked if he could deliver a QSL card on his next trip to Ulsan. The recipient was Jin, HL5XF. Joe managed to track down Jin after his arrival and they journeyed together to the local ham outlet. It wasn't difficult to find. Notice the word "ham," in English, on the storefront sign!



**You don't need a stovepipe hat to copy CW, but it helps.**  
Jim Wilson, K4BAV (left), and Roland Anders, K3RA (right), members of the Morse Telegraph Club, step back in time to demonstrate their keying skills, 1840s style, at the B&O Railroad Museum in Baltimore, Maryland.



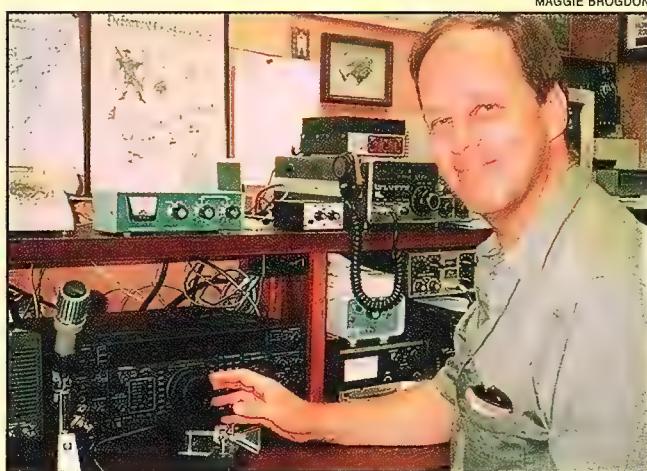
**Ham radio and woodworking combine at John F. Kennedy High School in Granada Hills, California.** Check out the impressive cabinet that houses the Kennedy Ham Radio Team's station! Instructor Robert Hazard, N6BNF, reports increasing interest in Amateur Radio among his students. Here Carolina Rodriguez, KF6FNS, makes a contact while Tony Salazar looks on.



**Forward into the past!** Alex Mendelsohn, AI2Q, wanted to see what it would be like to operate with the type of beginner's rigs that were popular in the 1930s. He decided to build a 30's beginner station from the ground up, searching fleamarkets for parts. The regenerative receiver (right) uses a Type 24 pentode as the detector, followed by a Type 27 triode audio amplifier. The transmitter is based on a crystal-controlled 6L6 Colpitts oscillator. It puts out about 8 W. With this old-time setup, Alex has made plenty of domestic and international contacts.



**NARLy, dude!** Last June the mayor of Newington, Connecticut honored the Newington Amateur Radio League (NARL) for its outstanding public service activities and proclaimed the last week of the month as "Amateur Radio Week." Gripping and grinning, from left to right are NARL board and committee members Ed O'Reilly, KA1ZOL; Fred Jarvis, N1KWJ; Karl Witter, WB1FNK; Joe Bottiglieri, AA1GW, (ARRL Technical Information Service Coordinator); Al Cohen, W1FXQ (Connecticut Public Information Coordinator); Bob Pratt, KD1LU, who accepted on behalf of NARL; and John Hennessee, N1KB, (ARRL Regulatory Information Specialist) who accepted on behalf of ARRL Headquarters.



**Midwest Division Vice Director Bruce Frahm, K0BJ, looks like the cat that just ate the canary.** Actually, it's the satisfied grin that appears when you've just purchased a new radio. The sunspots are finally on their way back, and Bruce is ready for winter DX.

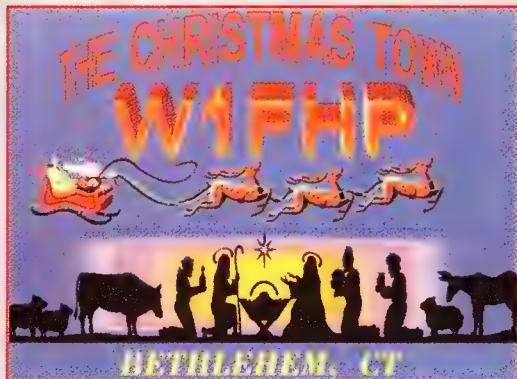
# The Night Before Christmas



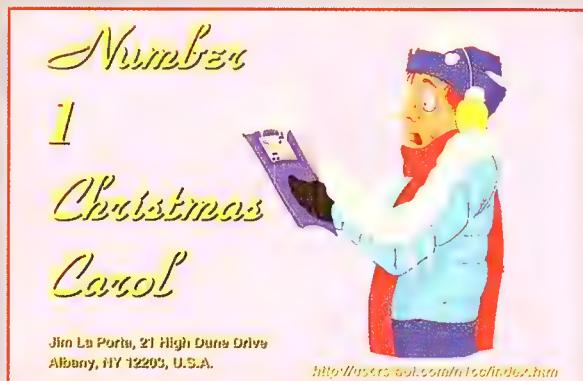
(The abbreviated version that Clement Clarke Moore *might* have written had he been a *QST* editor working on a tight deadline.)



'Twas the night before Christmas when all through the house, not a creature was stirring—except for the golden humanoid fish in the family room. Henryk Kotowski, SM0JHF, sent us this concept shot of a golden "fish" from a traditional Russian fable. After being hooked and hauled into the boat, the fish promised to grant three wishes if the fisherman would set her free. The angler must have been a ham because Henryk's golden fish is offering a CW paddle, a microphone and a digital interface!



QSL cards were hung by the chimney with care ... like this attractive "eyeball" card created by W1FHP in Bethlehem, Connecticut.



... in the hope that St Nicholas would soon be there. If he wasn't already frozen in place, like the frosty caroler on N1CC's QSL!



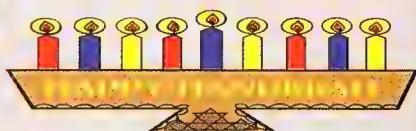
The children were nestled all snug in their beds ... while visions of 4-400As danced in their heads! Could you possibly find a warmer holiday scene than the one that graces K7YHA's Christmas card?



(And keep your cameras handy this Holiday Season. Send us your photos and you might see them in next December's *QST*!)

When out on the lawn there arose such a clatter, I sprang from the bed to see what was the matter. It was Santa and his reindeer tangled in the lights hanging from the tower that supports the HyGain TH7-DXX owned by John, WA0DYU. We hope his homeowner's insurance covers injuries to supernatural entities.

But I heard him exclaim, ere he drove out of sight, "Good DX to all! And, to all, a good night!"



# Full Line of *quality*

## UNIVERSAL CHARGER

### MH-C777 *Universal* *Rapid Charger* *Conditioner*

- ✓ Will charge **nearly any type of rechargeable NiMH and NiCD battery packs!**
- ✓ Will **discharge** and **condition**!
- ✓ Latest **-dV** and **temperature** Detection
- ✓ Support **4.8-12V**
- ✓ For mobile and base use!
- ✓ **Free car adapter included!**

**Charge nearly all of your amateur radio battery packs with it, plus more.....**

Cellular, Notebook Computer, Two-Way Radio, R/C, and more!



The MH-C777 will not only charge your battery but also condition it!

Powerful magnet that will hold your battery pack in place!

From your local dealer....

Use **Maha Universal MH-C777 Charger** with **Maha NiMH Battery Pack** to commence operation with highest quality and reliable ever!

**\$ 49.95**

**MAHA**

*"Your Supplier, Your Partner,  
Your Friend!"*

**Call Your Local Dealer  
For More Information!**

# Handheld Accessories...

- ✓ New technology
- ✓ No memory effect
- ✓ 50-100% more capacity than same size NiCad
- ✓ Light weight
- ✓ Flat Discharge Curve
- ✓ Small Size
- ✓ Environmental friendly
- ✓ Many other models available
- ✓ One Year Limited Warranty for all battery packs

## NiMH BATTERY PACKS

1800mAh



1000mAh



MH-101 series NiMH/NiCD  
rapid smart chargers for  
popular radios!

## POWER AMPLIFIERS



Maha's new **docking boosters** are the affordable solution to your weak signal problems. The MH-A300 series docking booster utilizes a compact amplifier, and with the appropriate adapter, you will boost the 5 watt output power of your handheld to the higher output power of a more expensive mobile radio while maintaining the portability of your handheld. You can instantly switch from a powerful mobile radio to a portable handheld with ease! Put your radio on Maha's new MH-A300 series docking booster and see what it can do for you!

CHANGE YOUR  
COMPACT  
HANDHELD INTO A  
**POWERFUL  
MOBILE  
INSTANTLY!**



MH-800S:  
For Alinco/Icom/Standard  
Yaesu

MH-800K:  
For Kenwood

MH-800Y:  
Works with  
FT-50R &  
VX-1R!!

You are looking at the best speaker/microphone in the industry. The MH-800 series consists a **Super 500mW Speaker**, and a crystal clear microphone. It can sound as good as your rig! Put the Maha MH-800 series speaker/mike on your handheld and experience the difference!

**\$ 19.95**

MH-800Y: \$ 24.95

### MH-A104 PRO

- ✓ 2m : 100W @ 4W in!
- ✓ Adjustable Output & Gain
- ✓ Adjustable Pre-Amp
- ✓ Output Indicator, and more....
- ✓ FM/SSB/CW All Mode!!

**NEW!  
PRO!**

MH-A101: 2m/35W @ 5W

MH-A102: 2m/35W @ 5W Pre-Amp, SSB/FM

MH-A103: 2m/50W @ 5W Pre-Amp, SSB/FM

MH-A201: 2m/70cm 45/35W @ 5W

MH-A301: 2m/50W @ 5W Pre-Amp

MH-A302: 2m/70cm 45/35W @ 5W

Also Available

## SPEAKER/MICROPHONES

### VOX & PTT All-In-One

Try the new Maha VOX and feel the difference with the **new reduced price!!**

- ✓ Super noise immunity!
- ✓ Maha VOX provides maximum protection against accidental transmission.
- ✓ Use as a PTT too! Instantly switch from PTT to VOX.



MH-VOX-S  
For Alinco/Icom/Standard  
Yaesu

MH-VOX-K  
For Kenwood

MH-VOX-M  
For Motorola Radius

Call Your Local Dealer  
For More Information!

**MAHA**

*"Your Supplier, Your Partner,  
Your Friend!"*

All brand names are the registered trademark of their owners.

# Correspondence

**Your opinions count!** Send your letters to "Correspondence," ARRL, 225 Main St, Newington, CT 06111. You can also submit letters by fax at 860-594-0259, or via e-mail to: [qst@arrl.org](mailto:qst@arrl.org). We read every letter received, but we can only publish a few each month. We reserve the right to edit your letter for clarity, and to fit the available page space. Of course, the publishers of *QST* assume no responsibility for statements made by correspondents.

## NOT "A VISION OF OUR FUTURE"

♦ As a relatively new ham (licensed 3½ years ago), as well as a new member of the ARRL, I felt compelled to respond to the letter from Ron, KA4EET, which appeared in the October "Correspondence."

It would seem that Ron is, in effect, foreseeing the end of the hobby at the hands of the Internet, a point I cannot see, nor accept. His cute story about Jim, a 20-year veteran of the hobby, was going along just fine until he got to the end.

During the conversation Mike mentioned that he was selling off his ham gear. "Our town is wired for high-speed Internet access," he said. "I can talk and exchange video with people anywhere in the world without worrying about propagation."

The gist of Ron's story, it seemed, was that the computer age was ultimately going to be the means to the end of Amateur Radio. Now, let me present another side to this. I must start by saying that the Internet is merely an enhancement to our hobby. Yes, I can use it to communicate with people all over the world, but the Internet doesn't inspire me to abandon my radio. On the contrary, communicating over the same distance via Amateur Radio presents an enjoyable *challenge* that the Internet lacks.

May I suggest, respectfully, that we look at the real reason why Amateur Radio may suffer in the future? Quite simply stated, it is because the older generation is getting tired. I have been told countless times, "We've done our share. Get some of the new guys in on it." This may be good from the standpoint of getting younger hams involved, but we still need the veterans to show us the ropes! We need their ideas for electronic projects, for building antennas and their guidance in learning proper etiquette on the HF bands. In short, we need you Old Timers to do the same things your Elmers taught you back in the good ol' days.

It's not time to hang up your working shoes just yet. If you don't take time to Elmer some of us along, your prophecy of Amateur Radio's end might well come true! However, if this hobby is such a great thing, shouldn't we be willing to talk about its benefits? I realize some do, but the fact is, we *all* need to do it!

No, the computer will not end Amateur Radio, but lack of interest and Elmering could. I've heard all I can stand about, "Those no-code Techs!" Take them under

your wings and get them excited about learning the code! In turn, they'll probably upgrade and pass on your wonderful gifts. The greatest tragedy would be to deny young hams a chance to learn. One of the best Elmers in ham history, Doug DeMaw, W1FB, recently became a Silent Key. Who's going to take his place and continue the tradition?—*James Bates, KB8TNQ, Mason, Michigan*

## MORSE EXEMPTIONS

♦ When reading the October editorial ("It Seems to Us...Morse Exemptions"), I thought it was a late, or an early, April Fool story. This has to be a joke; the ARRL is spending time, money and effort on a problem that does not exist while the hobby suffers from a wide variety of obvious afflictions.

You are asking the FCC to amend its rules, and you are imposing new policies on your VEs, to address an insignificant percentage of abuses regarding license upgrades. This problem is not worth the effort to count the number of applicants who "might" be abusing the Morse Exemption rules. This is a waste of my dues money.

I suggest that the leadership of the ARRL remove their heads from deep in the sand pit where you have stuck them and stop chasing the demon that does not exist. Turn around and face the real demons nipping at your butts.

Your first effort should be to petition for FCC rule changes that reduce the code requirement to 5 WPM for all license classes and to further pressure the international community to remove the requirement altogether. Morse communication will always have a part in our hobby, but it no longer makes sense to have it as a requirement for licensing.

Next, you should focus your efforts on ways to introduce the hobby to our very young citizens. I'm certain there are many ways to address the very "real" problems facing our hobby now and in the future.

I suggest that the League address the serious issues facing our hobby and ignore the frivolous, as difficult as that may be, or there may be no Amateur Radio to protect.—*John M. Anzivino, WA2QYX, Jersey City, New Jersey*

♦ I was pleased to read "It Seems to Us..." in the October *QST*. The problem of phony medical exemptions for code testing is serious. I'm glad to see that the ARRL

is taking positive action on this issue.

There is another CW testing problem that needs to be addressed along with Morse exemptions—multiple-choice exams.

I don't want to take anything away from those who passed their code tests by using the multiple-choice exams. Many of them truly comprehend Morse code proficiently. What really disappoints me are those who take the code elements and manage to pass *without* true understanding or proficiency. Multiple-choice testing makes this possible. For example, I look at some of the copy sheets and see only shorthand. They get just enough information to figure out the correct multiple-choice answers. Remarking to one of these candidates about his code comprehension elicited this reply: "Hey! I'm a no-code Extra!"

The ARRL offers fill-in-the-blank and multiple-choice code exams to its VE teams. But the teams that I've served with have encountered great pressure *against* using the more difficult fill-in-the-blank tests. Arguing against the multiple-choice exams can make one very unpopular, so peer pressure wins the day.

In spite of this sad state of affairs, I will continue my VE activities. Seeing the majority of candidates earning credits the old fashioned way, by studying and practicing, gives me great satisfaction. It's my way of putting back into Amateur Radio what I got out of it. Yes, let's close the medical waiver loophole, then re-examine the wisdom of the multiple-choice Morse exam.—*Robin Zinsmaster, N6PHP, Sebastopol, California*

## KUDOS TO TEENS!

♦ With reference to the letter from Chris Johnson, AE4KN, in the September, 1997 "Correspondence," all I can say is, "Wow! What a great letter from a younger ham!"

As an old-time ham (licensed for 45 years), I frequently concern myself with exactly the same things that concern this 16 year old.

I have taught code to teenagers, and they pick it up very quickly—which brings me to good quotation from Chris's letter: "It's just not that hard. Kids who learn the code agree, and they'll tell you that it's the adults who are doing most of the anti-code griping." If there are a lot of younger hams out there who have the same attitude as Chris, I'm not going to worry any more about the future of the hobby. I'll bet he

gets great marks in school, too!—*Summer Weisman, W1VIV, Framingham, Massachusetts*

♦ Three cheers for Chris Johnson, AE4KN, and Daniel Sanderman, KC7RMS ("Teens Speak," September "Correspondence")! They called it like it is. It's great to see young hams speaking out for Amateur Radio. And like Chris says, "...the whining has become tiresome". If hams don't want to learn the language of CW, then don't ask for the privileges or complain if someone else uses the mode. I don't use CW as much as I want to, but I'll support those who do. CW has its place. There is more than enough "room" in our diverse hobby for all modes.—*Dennis Barthel, W6HRH, Woodland Hills, California*

### A HAPPY ENDING

♦ Early this year I wrote a letter telling of how my wife was turned off by ham radio because of the language used on HF (March 1997 "Correspondence"). I was becoming pretty cynical about Amateur Radio, too.

Well, I received literally dozens of letters in response! Many offered words of encouragement and sympathy. Others offered tips on how to avoid the bad apples.

I upgraded to General a few months ago and I'm enjoying the hobby immensely—even 75 meters! I did as you kind-hearted guys suggested in your letters. I ignored the worst and looked for the best. As a result, I found the Southern Country Cousins Net on 3970 kHz, along with the Popcorn Net and the Good Morning Kentucky Net. What a terrific bunch!

I am happy to report I was wrong; ham radio can still be fun. I'm also dabbling in SSTV, RTTY, CW, and AM and having a ball. And, yes, my wife is revising her opinion of our hobby as well. Thanks for all the encouragement, especially from John, KE4EWS, and Ted, N4XX.—*Rick Wallis, KA4VHV, Resaca, Georgia*

### TWELVE THINGS YOU CAN DO

♦ Here are 12 things you can do *today* to benefit Amateur Radio:

1. Get on the air. Make noise. An unused band is a lost band.

2. Learn something about a mode you've never tried. In my case, it's the digital modes and satellites.

3. You're here to communicate. When someone asks, "Is that a CB radio?" explain what it really is, what you can do with it, and why one would use it.

4. Upgrade, if possible.

5. Go mobile. Make yourself visible. I receive a lot of weird looks when people see the 13-foot tall antenna on my car. But when I ask, "Would you like to know what that monster antenna is for?" they usually say "Yes, but I was afraid to ask."

6. Try some outdoor events; some friends and I did QRP Afield, a type of QRP Field Day. We put up a 20-foot continuously loaded whip on a 32-foot mast in the

middle of a field. No fewer than a dozen people, including a bunch of 12-14 year-olds, came by to take a look.

7. Lose your shyness about our hobby. Most people these days are clueless about ham radio; be a ham radio emissary. Be their first exposure to radio, so they can develop some positive ideas about hams before someone else gets to them.

8. Make a contact on HF SSB in front of a crowd of kids. They do think it's cool (trust me)! Hand 'em the mike and see if they're unimpressed!

9. Explain how repeaters work and who can "own" or construct one. Do an on-air demo. Explain how we use satellites, and even bounce signals off the moon.

10. If possible, make a CW contact for the same group of kids. Remember that CW is mysterious to most people—and that's its attraction. Play the mystery for all it's worth, then show them how to "solve" it.

11. Do public service events and wear your call-sign badge proudly. Crank up the volume on your H-T!

12. Talk enthusiastically to new hams. Your attitude goes a long way toward forming their impressions.—*Scott Rosenfeld, NF3I, Burtonsville, Maryland*

### DONATE!

♦ Here is an easy way for your radio club to increase public awareness of Amateur Radio, the ARRL, and the club itself. The effort is minimal and all it costs is money. Simply donate a subscription to *QST* to your local public library.

Many public libraries are on tight budgets. They are sure to welcome a free donation of a magazine subscription. There should be little effort involved for them. Often, all they need to do is put the magazine in a nice plastic cover. They should be more than willing to let you put a notice on the cover saying, "This magazine donated by the Podunk Hollow Amateur Radio Club." You might even be able to list a club contact person, a meeting notice, or the local repeater frequency.

How does this help Amateur Radio? Someday soon, a ham-of-the-future will be in the library looking for something to read. Once he picks up *QST*, he's hooked. By the same token, the ham who has been inactive for 30 years will pick up *QST* and find out all the wonderful things he's missed. In both cases, Amateur Radio benefits.

How does this help the ARRL? The new ham and the old-timer will both see all the things the League has to offer. They'll be dying to join the ARRL. The ARRL benefits.

How does this help the local radio club? The new ham, the old-timer, the lost local, and the ham who just moved into town are all looking for a radio club. Your notice on the cover gives them all the information they need to find you. Your club benefits.—*Al Bates, W1XH, Chelmsford, Massachusetts*

# DSP Software

**DSP Blaster™ 2.0** uses your PC and sound card to provide tunable highpass, lowpass, and bandpass filters, autotracking CW peaking filter, automatic notch filter, coherent phase-locked CW processor with stereo output, adaptive noise reduction, and AGC. *DSP Blaster* graphs the audio waveform, spectrum, and CW phase. A system block diagram simplifies use. Just mouse-click a filter block to activate it. *DSP Blaster* lets you dig dirt-weak signals out of the noise, makes listening much more pleasant, and can run in the background. \$125. Notch filter alone, \$35.

**RTTY 2.0** is a high-performance DSP modem for RTTY and PACTOR. The limiterless front-end, sharp BPF, autotuned optimal filters, ATC, polar-flutter suppressor, numerical flywheel, packet repair, and memory-ARQ recover signals other modems can't. *RTTY* features an FFT spectral tuning indicator that's better than a scope, a demodulated-signal display, variable mark/space frequencies, precision AFSK, FSK & PTT outputs, and supports WF1B's RTTY-contest logger. \$150.

486DX, VGA, and 16-bit Creative Labs sound card required ("compatible" cards won't work). Both DSP programs, \$250.

# Antenna Optimizers

**AO 6.5** automatically optimizes antenna designs for best gain, pattern, impedance, SWR, and resonance. *AO* uses an enhanced, corrected MININEC algorithm for improved accuracy. *AO* features 3-D radiation patterns, 3-D geometry and wire-current displays, 2-D polar and rectangular plots with overlays, automatic wire segmentation, automatic frequency sweep, skin-effect modeling, symbolic dimensions, symbolic expressions, current sources, polarization analysis, near-field analysis, and pop-up menus.

**NEC/Wires 2.0** accurately models true earth losses, surface waves, and huge arrays with the Numerical Electromagnetics Code. Best for elevated radials, Beverages, wire beams, giant quads, delta loops, LPDAs, local noise.

**YO 6.5** automatically optimizes monoband Yagi designs for maximum forward gain, best pattern, minimum SWR, and adequate impedance. *YO* models stacked Yagis, dual driven elements, tapered elements, mounting brackets, matching networks, skin effect, ground reflection, and construction tolerances. *YO* optimizes Yagis with up to 50 elements and does it hundreds of times faster than NEC or MININEC.

**NEC/Yagis 2.5** provides reference-accuracy modeling of individual Yagis and large arrays. Use *NEC/Yagis* to model big EME arrays.

**TA 1.0** plots elevation patterns for HF antennas over irregular terrain. *TA* accounts for hills, valleys, slopes, focusing, shadowing, diffraction, reflection, diffraction-excited reflection, and finite ground constants. Use *TA* to optimize antenna height and siting for your particular QTH. Requires topographic map.

One antenna program, \$70; three, \$120; five, \$200. 386, math coprocessor, VGA required. Visa, MasterCard, Discover, U.S. check, cash, or money order. Add \$5 overseas.

**Brian Beezley, K6STI • 3532 Linda Vista San Marcos, CA 92069 • (760) 599-4962**  
**[k6sti@n2.net](mailto:k6sti@n2.net)**

**SYNTHESIZED  
VHF FM EXCITER  
& RCVR MODULES**

**No more waiting for crystals!**

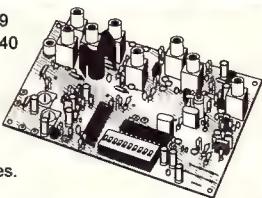
Hamtronics is pleased to announce a new line of its vhf fm transmitters and receivers, popular for repeaters, voice and data links, control, telemetry, and other demanding applications.

New T301 Exciter and R301 Receiver provide high quality nbfm and fsk operation on 144-148 MHz (and 148-174 MHz for export and gov't services). Features include:

- Dip switch frequency selection.
- Exceptional modulation for voice and ctcss.
- Direct fm for data up to 9600 baud.
- Commercial grade tcxo for tight frequency accuracy in wide range of environmental conditions: 2ppm -30 to +60°C.
- Rated for continuous duty, 2-3W output.
- In stock for same day shipping.

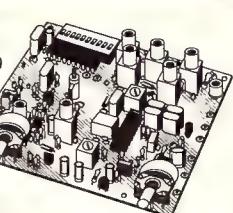
**TA301 EXCITER**

- Kit .....only \$109
- TCXO option ...\$40
- Wired/tested ...\$189  
(includes TCXO)
- Inquire about  
models for  
higher frequencies.



**R301 RECEIVER**

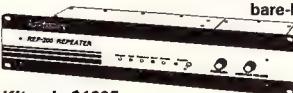
- Kit .....only \$139
- TCXO option ...\$40
- Wired/tested ...\$209  
(includes TCXO)
- Our traditional  
crystal-control  
receivers and  
exciters are  
still available for all  
vhf and uhf bands.



You get more features for your dollar with our:

**REP-200 REPEATER**

A microprocessor-based repeater with autopatch and many versatile dtmf control features at less than you might pay for a bare-bones repeater or controller alone!



Kit only \$1095  
w&t only \$1295

50-54, 143-174, 213-233, & 420-475MHz. (902-928, slightly higher)

**Now - 2 meter machines in stock for  
next day shipment! Call for details.**

See prior months' ads for more products. We make a full line of VHF & UHF FM Xmtrs & Rcvrs, PA's, Data Modems, Preamps, Helical Filters, Repeater Controllers, Autopatches, DTMF and Subaudible Tone Decoders, Digital Voice Recorders, WWV Rcvrs, Weather Fax Rcvrs.

**CALL OR WRITE FOR FREE CATALOG**  
or view it at <http://www.hamtronics.com>  
See our full page ad in 73 Magazine.

**hamtronics, inc.**  
65-Q Moul Rd; Hilton NY 14468  
Phone 716-392-9430 (fax 9420)  
email: [jv@hamtronics.com](mailto:jv@hamtronics.com)

# This Month in Amateur Radio

Ask people to name their favorite months of the year and December is likely to be near the top of most lists. Regardless of which religious faith you hold, if any, you can't help feeling the warmth and fellowship of the Holiday Season. Even the most curmudgeonly among us find reasons to smile this month!

We get off to an exciting start with the **ARRL 160-Meter Contest**, December 5 through 7. If you don't have a dedicated 160-meter antenna, put up as much wire as possible, feed it with an antenna tuner and have fun! See the complete rules on page 107 of your November *QST*.

*Oh little town of Bethlehem ...*

**Bethlehem, Connecticut**, is the site of the "Christmas from Bethlehem" celebration throughout December. Listen for the Hen House Gang station, W1FHP, on 40 and 20 meters.



**Bethlehem, Indiana**, is observing the season December 12 and 13. The Clark County Amateur Radio Club will have W9WWI on the air on 80 and 40 meters.

**Bethlehem and Nazareth**, Pennsylvania, will be on the bands with an appropriate call sign, WX3MAS, December 13 and 15.

*Santa Claus is coming to town ...*

From St. Nick's "midwestern office" in **Santa Claus, Indiana**, the Legion of Indianapolis DXers will be operating W9IND on December 13 and 14.

If you don't find the jolly old elf in Indiana that weekend, look in **Edgewater, Florida**. That's where Coronado Wireless Association (KE4AG) will be taking to the airwaves for their annual Christmas event.

With all the Christmas activity on the weekend of December 13 and 14, we hope Santa will have time to participate in the **ARRL 10-Meter Contest**.

**Contest**. In case you haven't heard the news, sunspots are on the increase. Will their influence be felt during this year's contest? The only way to know is to get on the air.

December ends, as it always does, with a bang...

On December 28 the Radio Amateurs of Canada kick off their 24-hour **Winter Contest**. See their contest Web site at <http://www.rac.ca/CANWIN.htm>.

Three days later we ring in 1998 with the **ARRL Straight Key Night**. Celebrate the new year by reacquainting yourself with CW à la straight key. See the announcement in this issue.

And while you're singing Auld Lang Syne to your friends and neighbors, take a break and check out the New Year special-event stations in **Fullerton, California (W6ULI)**, and **Rockford, Illinois (W9AXD)**. You'll find details on all Holiday Season operations in "Special Events."



# WE'RE STANDARD AND WE'VE GOT YOUR STYLE!

Superior  
Intermod  
Rejection!

STANDARD PIONEERS ANOTHER FIRST!! THE C5718DA & C1208DA IS PACKET READY!

Designed with packet in mind. Out-of-the-box high-speed, 9600 baud, interface. Just connect your TNC to the radio and you're on the high speed packet network. Also, operates at 1200 and 2400 baud equally well.



C5718DA



C1208DA



**C5718DA TWIN-BAND MOBILE**  
50 Watts of power totally controlled from the microphone! Remote this radio anywhere!

**Unsurpassed intermod rejection.**

Built in Antenna Duplexer.

Dual frequency receive; two VHF, two UHF, or VHF/UHF.

Frequency range:

Receives 110-199.995 MHz (including AM aircraft) and 250-499.995 MHz.

50 Watts 2M, 40 Watts 70cm (3W Low, 10W Medium selectable)

Memories: 40 (20 per band); stores frequency, offsets and CTCSS tones.

200 memory channel option, CMU182.

CTCSS Encode/Decode standard.

Frequency steps, 5, 10, 12.5, 15, 20, 25, 50 and 100 KHz.

Full Duplex cross band operation with CTCSS tones.

Paging/Coded squelch.

DTMF autopatch dialing, 6 memories, 15 digits.

Eight kinds of scan, including priority and CTCSS.

Memory scan lock-out.

Back-lit Keypad and Display

Auto mute opposite band, three settings (-6, -12 and -18dB).

Cooling fan built-in.

Size: 5.51" W 1.57" H 5.31" D Weight 2.2 lbs..

Mobile bracket and power cord (2M) included.

MARS and CAP modification available (permit required).

Specifications, features and price are subject to change without obligation or notice.

STANDARD Amateur Radio Products, Inc.  
P.O. Box 48480, Niles, Illinois 60714

**STANDARD HAS EVERYTHING IN THE SPEAKER-MIC WHILE DELIVERING UP TO 50 WATTS!**

**C1208DA TWIN-BAND MOBILE**

The smallest, lowest price 2 meter mobile radio that delivers all the features. Mount it under a seat or even in the trunk using the optional extension cable (CAW561 or CAW562).

Frequency range:

Receives 110-199.995 MHz (including AM aircraft) and 250-519.995 MHz.

50 Watts, 10W and 3W selectable

Built in Antenna Duplexer for 450 MHz receive

Memories: 100; stores frequency, offsets and CTCSS tones.

CTCSS Encode/Decode standard.

Frequency steps, 5, 10, 12.5, 15, 20, 25, 50 and 100 KHz.

Paging/Coded squelch.

DTMF autopatch dialing, 10 memories, 15 digits.

Six kinds of scan, including priority and CTCSS.

Back-lit Keypad and Display

Auto mute: four settings (-10, -20, -30 and off)

Semi Duplex cross-band operation with CTCSS tones

Cooling fan built-in

Size: 5.51" W 1.18" H 5.79" D Weight 1.65 lbs..

Mobile bracket and power cord (3M) included.



# STANDARD



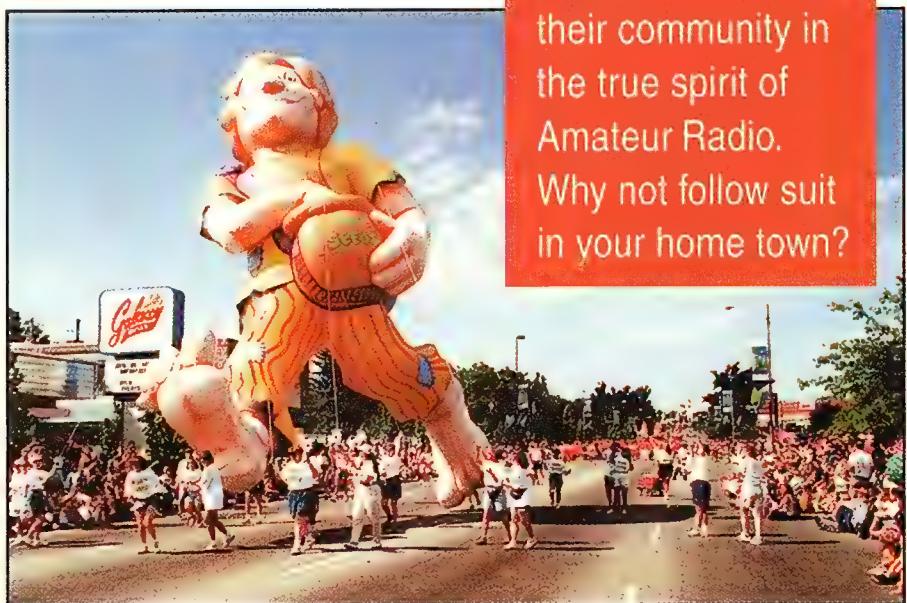
# The Boise River Festival: An Amateur Radio Showcase

Balloons over Boise! Seventy hot-air balloons launched at sunrise on Saturday.

**T**he Boise River Festival is a showcase for Amateur Radio public service technology that got its start with the first Boise River Festival some six years ago. Boise Police Officer Harry Kindelberger came to a Voice of Idaho Amateur Radio Club meeting looking for volunteers to help with traffic and crowd control at the Saturday morning River Giants Parade. At that time, the Nite-Light Parades were held on the Boise River.

For the seventh year, club members and other area hams again played a key role in the 1997 event, held June 26-29. Hams helped with traffic control before, during and after the parades; they provided visual amateur television (ATV) links to help officials with crowd management; and they patrolled the perimeter of the fireworks area.

The great thing about using hams for this kind of duty is that actions over the entire parade route can be coordinated instantly via hand-held radio. Traffic barricades—manned by hams and used to secure the parade routes—can be erected and



Each year, nearly a million visitors flock to Idaho's Boise River Festival for a little summer fun. To help things run smoothly, members of the Voice of Idaho ARC, and other area hams, volunteer their time to provide communications and event coordination to local agencies. (All photos supplied by the authors.)

Thanks to an ever-evolving mix of dedication, technology and ingenuity, Boise, Idaho, hams serve their community in the true spirit of Amateur Radio. Why not follow suit in your home town?

**Aaron Rynearson, KC7OWJ (left), and Hans Blohm, KC7MWA (right), operate one of the ATV mobile units.**



removed when needed, minimizing traffic disruptions. Hams serve as additional eyes and ears when it comes to public safety. And because we're in close contact with the Boise PD, whenever trouble erupts we can report it immediately. The Boise hams have become known as Festival Ambassadors. If we can't answer questions about festival events, locations, schedules, etc, we can quickly call someone who can.

Moving the Nite-Light Parades to downtown streets in 1994 added another dimension to parade duty—night operations. With the crowds growing year after year, the Boise PD needs all the help it can get to ensure public safety.

Coordinating all the radio traffic requires the use of the Ada County Amateur Radio communications van and two or more net control operators. A packet radio link ensures solid, secure communication between the van and the command center. As an added benefit, the digital data link provides silent communication in the noisy command center environment.

About the second or third festival, someone—probably Mr ATV himself, Brian Rayl, N7MOE—brought up the idea of using amateur television to provide real-time images of remote festival locations to the Boise PD Command Center. This has worked well over the years, and festival officials are quick to take advantage of their remote eyes and ears. The PD dispatches an ATV crew to spots that need surveillance. Detailed instructions (tilt, pan, zoom) are communicated via two-way radio while the duty officer watches the live video feed. Soon after ATV's initial success we added video taping capabilities at the command center. With ATV we helped children find lost parents, recorded traffic accidents, and even taped an assault on an officer!

ATV teams started out on foot, but to gain more mobility, the operators switched to bicycles. (In recent years the PD has also provided golf carts.) Three ATV teams are deployed in the field; one transmits continuously on 426.25 MHz while two other teams share 434 MHz on a rotating basis. One 434-MHz crew transmits while the other crew is in transit to an assigned location. When the in-transit crew reaches their destination, they go on the air and the first 434-MHz crew shuts down and starts moving to *their* new assignment. If either crew spots trouble, they call it in and quickly begin sending video (if they aren't already). Two big-screen TVs in the command center allow the watch commander to monitor both 426.25 and 434 MHz channels simultaneously.

This year, a new dimension was added to give festival and police officials real-time information on the progress of the festival's three parades (two evening Nite-Lite parades and the Saturday morning River Giants parade). Two self-contained Automatic Position Reporting Systems (APRS) were used, along with four fixed units. The portable units were placed on



**Mike Hardcastle, KB7TRJ, and his self-contained APRS unit.**



**Brian Mahaffy, N6UGP, net control operator in the Ada County ham van.**



**Mike Hardcastle, KB7TRJ, Voice of Idaho ARC membership director, and Steve Wade, KF7YC, VOI newsletter editor and ARRL public information officer, discuss ham activities in support of the festival on KIDO's "PM Idaho" show.**

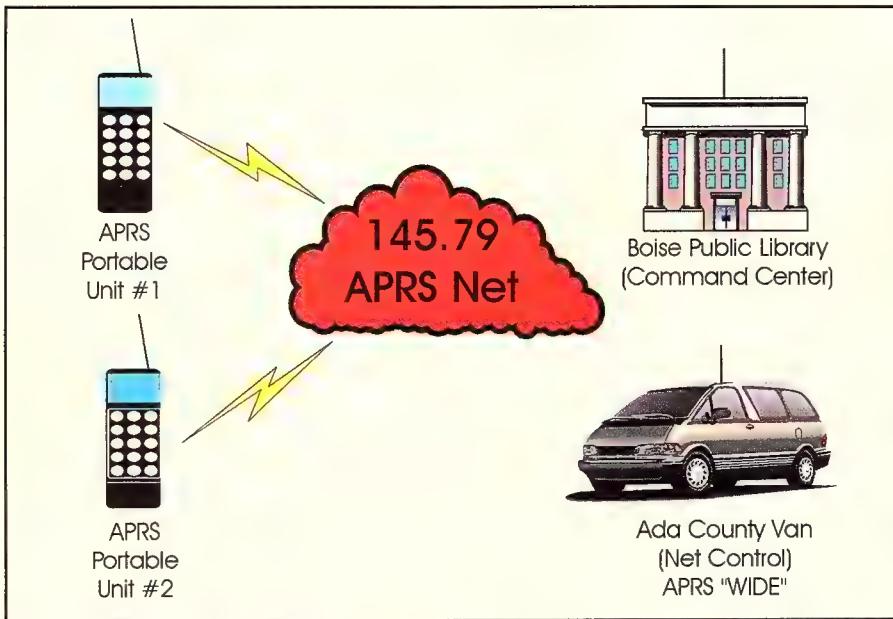


Figure 1—To provide served agencies with real-time parade progress reports via computer, Voice of Idaho ARC members implemented this position reporting system.

floats and tied into the APRS network. Each APRS unit consists of a Global Positioning System (GPS) receiver listening to a constellation of satellites to determine its position. Every few seconds the GPS receiver automatically feeds this information to an attached packet station (TNC and H-T) operating in beacon mode to transmit the coordinate data.

At the command center, a video projector was used to display a large computer-generated image of the parade's progress. Festival officials were amazed at the sophistication and usefulness of APRS ham radio technology.

Local media outlets—newspaper, radio and television—have been great in getting out information about our festival involvement. Nearly a million visitors participate in the festival each year, making it the largest event in Idaho and one of the premiere events in the country. Attendees spend some \$40 million annually in Boise and the surrounding communities, making the festival an important financial booster for this part of Idaho.

The 1997 festival was supported by 35 operating committees and volunteers who provided more than 40,000 hours toward making the event a success. Participation of the Amateur Radio community, as usual, is on a volunteer basis as well, and most hams use their own or club-owned equipment.

In Boise, public service is what ham radio is all about!

*Barrett is president and Wade is newsletter editor and public information officer of the Voice of Idaho Amateur Radio Club in Boise, Idaho, an ARRL Special Service Club. You can reach Steve Wade at 7097 Garden Glen Ln, Boise, ID 83703, e-mail [KF7YC@rmci.net](mailto:KF7YC@rmci.net)*



Voice of Idaho Amateur Radio Club president Tony Barrett, N7MTZ (right), is interviewed by a crew from KTVB-TV during the festival.

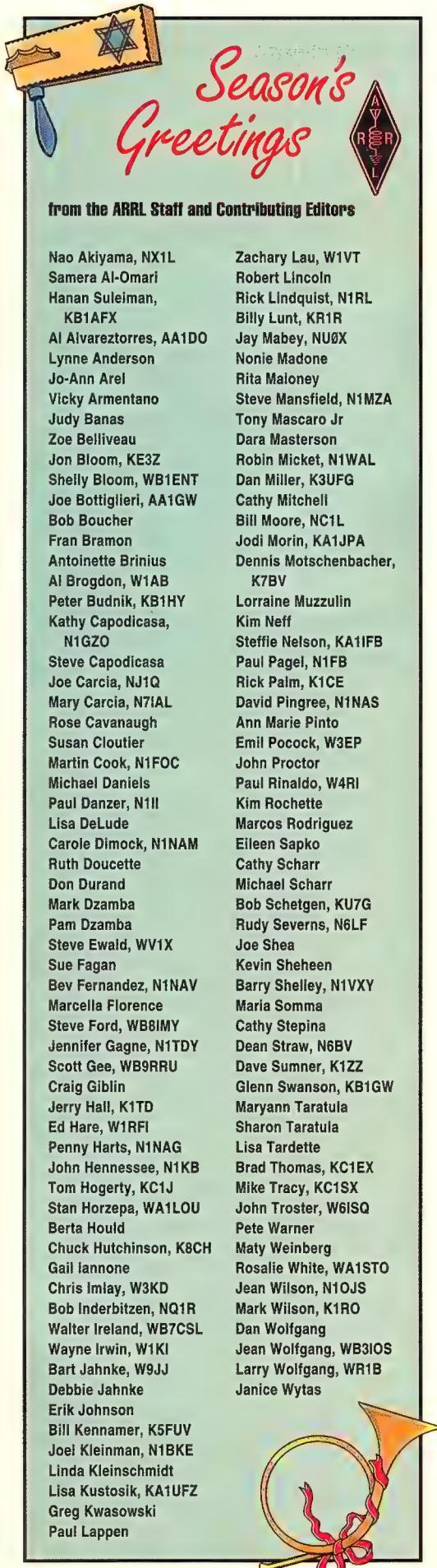
## Public Service Resources

Public service communication has been a mainstay of the Amateur Radio Service since 1913. In today's world of Amateur Radio, disaster and public service communication is a highly organized and worthwhile part of day-to-day operation, implemented mainly through the Amateur Radio Emergency Service (ARES) and the National Traffic System (NTS), both sponsored by ARRL. The Radio Amateur Civil Emergency Service (RACES), independent nets and other amateur public service groups are also a part of ARRL-recognized Amateur Radio public service efforts.

To learn more about the services mentioned above, and to get your start in public service communications, call or write to the League's Field Services Department at ARRL HQ or check out the following ARRL publications, which can be found in the Public Service section of the League's on-line Publications Catalog at <http://www.arrl.org/catalog>.

The *ARRL Public Service Communications Manual (PSCM)* serves as an overall source of basic information on the League's public service communications program. Comprising 61 pages in its printed form, the PSCM is also available via *ARRLWeb* in two formats: Hypertext Markup Language (HTML) and Adobe Portable Document Format (PDF).

The *ARES Field Resources Manual* is a quick trainer and resource guide for every emergency communicator. Also useful is the *Special Events Communications Manual*, which is full of tips and suggestions to help plan effective special-event communication activities. A more advanced offering is the *ARRL Emergency Coordinator's Manual*, which covers some of the finer points of Emergency Coordinator duties, as well as recruiting and obtaining the necessary resources to properly plan and implement effective emergency and disaster communications.



W1AW schedule										
Pacific	Mtn	Cent	East	Sun	Mon	Tue	Wed	Thu	Fri	Sat
6 am	7 am	8 am	9 am						Fast Code	Slow Code
7 am	8 am	9 am	10 am						Code Bulletin	
8 am	9 am	10 am	11 am						Teleprinter Bulletin	
9 am	10 am	11 am	noon							
10 am	11 am	noon	1 pm							
11 am	noon	1 pm	2 pm							
noon	1 pm	2 pm	3 pm							
1 pm	2 pm	3 pm	4 pm	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
2 pm	3 pm	4 pm	5 pm						Code Bulletin	
3 pm	4 pm	5 pm	6 pm						Teleprinter Bulletin	
4 pm	5 pm	6 pm	7 pm	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code
5 pm	6 pm	7 pm	8 pm						Code Bulletin	
6 pm	7 pm	8 pm	9 pm						Teleprinter Bulletin	
6 <sup>45</sup> pm	7 <sup>45</sup> pm	8 <sup>45</sup> pm	9 <sup>45</sup> pm						Voice Bulletin	
7 pm	8 pm	9 pm	10 pm	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code	Fast Code	Slow Code
8 pm	9 pm	10 pm	11 pm						Code Bulletin	
9 pm	10 pm	11 pm	Mdnt						Teleprinter Bulletin	
9 <sup>45</sup> pm	10 <sup>45</sup> pm	11 <sup>45</sup> pm	12 <sup>45</sup> am						Voice Bulletin	

W1AW's schedule is at the same local time throughout the year. The schedule according to your local time will change if your local time does not have seasonal adjustments that are made at the same time as North American time changes between standard time and daylight time. From the first Sunday in April to the last Sunday in October, UTC = Eastern Time + 4 hours. For the rest of the year, UTC = Eastern Time + 5 hours.

**Morse code transmissions:**

Frequencies are 1.818, 3.5815, 7.0475, 14.0475, 18.0975, 21.0675, 28.0675 and 147.555 MHz.

Slow Code = practice sent at 5, 7<sup>1/2</sup>, 10, 13 and 15 wpm.

Fast Code = practice sent at 35, 30, 25, 20, 15, 13 and 10 wpm.

Code practice text is from the pages of *QST*. The source is given at the beginning of each practice session and alternate speeds within each session. For example, "Text is from July 1992 *QST*, pages 9 and 81," indicates that the plain text is from the article on page 9 and mixed number/letter groups are from page 81.

Code bulletins are sent at 18 wpm.

W1AW qualifying runs are sent on the same frequencies as the Morse code transmissions. West Coast qualifying runs are transmitted on approximately 3.590 MHz by W6OWP, with K6YR as an alternate. At the beginning of each code practice session, the schedule for the next qualifying run is presented. Underline one minute of the highest speed you copied, certify that your copy was made without aid, and send it to ARRL for grading. Please include your name, call sign (if any) and complete mailing address. Send a 9x12-inch SASE for a certificate, or a business-size SASE for an endorsement.

**Teletypewriter transmissions:**

Frequencies are 3.625, 7.095, 14.095, 18.1025, 21.095, 28.095 and 147.555 MHz.

Bulletins are sent at 45.45-baud Baudot and 100-baud AMTOR, FEC Mode B. 110-baud ASCII will be sent only as time allows.

On Tuesdays and Saturdays at 6:30 PM Eastern Time, Keplerian elements for many amateur satellites are sent on the regular teletypewriter frequencies.

**Voice transmissions:**

Frequencies are 1.855, 3.99, 7.29, 14.29, 18.16, 21.39, 28.59 and 147.555 MHz.

**Miscellanea:**

On Fridays, UTC, a DX bulletin replaces the regular bulletins.

W1AW is open to visitors during normal operating hours: from 1 PM until 1 AM on Mondays, 9 AM until 1 AM Tuesday through Friday, from 1 PM to 1 AM on Saturdays, and from 3:30 PM to 1 AM on Sundays. FCC licensed amateurs may operate the station from 1 to 4 PM Monday through Saturday. Be sure to bring your current FCC amateur license or a photocopy.

In a communication emergency, monitor W1AW for special bulletins as follows: voice on the hour, teletypewriter at 15 minutes past the hour, and CW on the half hour.

Headquarters and W1AW are closed on New Year's Day, President's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving and the following Friday, and Christmas Day.

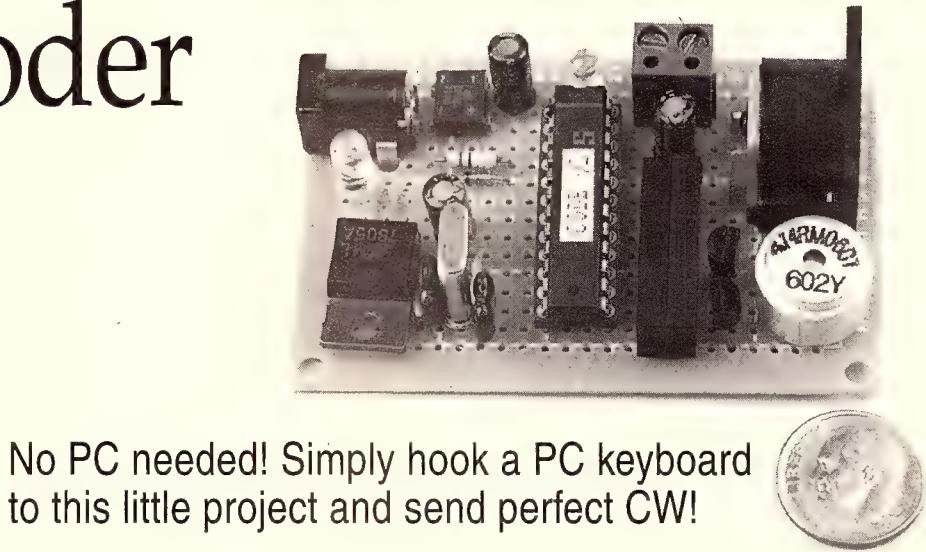
# A Computer Keyboard CW Encoder

After many years of CW inactivity, I felt the urge to renew my many memorable experiences of past CW QSOs. So I bought a hand key, switched my rig to CW and let fly! I jumped right in by using my straight key to answer a CQ being sent at a moderate speed—I wanted to ease the pressure of my first contact. I was surprised to discover that receiving CW was as easy as it was 20 years ago! Sending, however, was painful for me—literally—and probably just as mentally painful for my QSO partner, as I struggled to coordinate my hand, timing and thoughts.

My sending needed help, and I sought a solution more agreeable to me than practicing with any type of hand key. My thoughts drifted to using a PC keyboard. After all, I—like so many of us these days—use a PC keyboard at work and at home. My need and that idea resulted in the design and construction of the simple project described here. Cost? About \$35. That's cheap enough, isn't it?

## Design

My desire for simplicity centered the design around a single, easy-to-interface, 24-pin DIP microcontroller: the 87C751. As you can see in Figure 1, the number of external components required are few: a crystal and two small capacitors for the clock, and a diode/capacitor combination to supply a power-on reset pulse. Pins 18 and 19 of U1 connect directly to a PC/AT-compatible keyboard's **SERIAL CLOCK** and **DATA** lines for input. Pins 13 and 16 deliver the resultant key closure (negative true and positive true) outputs. Pin 13 is connected directly to a reed relay coil and the **KEY ACTIVE** LED, DS1. U1 delivers a 500 Hz sidetone output that is given a current boost by Q1 and Q2 to drive a subminiature audio transducer, LS1. The remaining circuitry simply handles the dc input voltage, of either polarity, to provide a stable 5 V source for the microcontroller and keyboard.



No PC needed! Simply hook a PC keyboard to this little project and send perfect CW!

## Construction

In my prototype, I soldered the parts to a single 2.85x1.85-inch Radio Shack project board, but a PC board is now available.<sup>1</sup> If you're using the PC board, just "stuff the parts." Here's my approach to using the project board: I placed all the components on the nonfoil side of the project board (the side with the silk-screened grid legend). The component leads and pins enter the holes of the 0.1-inch grid. (The pins of dc input jack J2 require their mounting holes first be enlarged using a 7/64-inch bit.) As you mount each component, solder its leads to the copper pads, then trim the leads as short as possible. I soldered insulated wire lengths—I like #30 silver-plated wire-wrap wire because of its sturdiness—to each pad that corresponds to that component's connection in the schematic. Generally, component placement is not critical. The only areas that theoretically could be sensitive are associated with the microprocessor clock, U1 pins 10 and 11 with Y1, C3 and C4, and their associated ground connections. Keep leads in those areas short.

As supplied by Digi-Key, the audio transducer has a strip of clear tape on it; remove the tape for increased loudness. (It makes a major difference!—Ed.) The circuit has no volume control, so keep the tape handy if you want quieter operation.

## Final Steps

Insert U2 into its socket, aligning the notch at its top toward the pin 1 end. Plug a tested PC/AT keyboard into the 5-pin DIN socket at J1. J2 accepts the larger (0.212-inch diameter) plug of a dc adapter (wall transformer or "wall wart"). Ensure the power supply provides an output voltage of 7.5 to 13.5 V at 200 mA. The upper-voltage limit is dictated primarily by the power dissipation of voltage regulator U2. (A standard 12 V, lead-acid battery with the charging system fully on will not carry excessive voltage.)

Connect a length of two-conductor wire to pins 1 and 2 of TB1, then to a plug that mates with the key jack of your transmitter. (I keep a hand key connected in parallel with the terminal block.) If you don't enclose the PC board in a cabinet, mount the assembly to your transmitter or desk using 3/4-inch-wide adhesive-backed Velcro strips or double-stick tape. If you've used project-board construction, make sure the component pins are short and that the connecting wires are kept close to the board for the adhesive to bond to the wire side of the board.

## Operation

### Basics

When power is applied, the keyboard's LEDs should flash momentarily. The keyboard then performs a basic assurance test, which can take up to five seconds. After that, press any letter key *twice* and you should hear *one* corresponding Morse-code character issue from the speaker. (The first

<sup>1</sup>Notes appear on page 35.



**Table 1****Special Characters, Function and Numeric Keypad Assignments**

Character or Key	Code
Question mark ? (not SHIFTed /)	-----
Left parentheses [ (left bracket)	- - - -
Right parentheses ] (right bracket)	- - - - -
Apostrophe '	- - - - -
Colon : (not a SHIFTed semicolon ;)	- - - - -
Hyphen -	- - - - -
Double dash =	- - - - -
Back slash \	- - - - -
Error sign (Tab or Backspace)	.....
Ctrl (use for prosigns; see text)	Removes space between successive characters
Esc	Clears keyboard and user-defined buffers, and restores all defaults

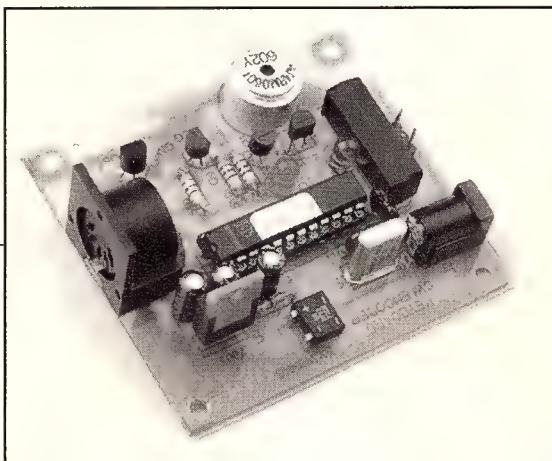
**Function Key Assignments****Key Function**

F1	Sends contents of user-defined buffer 1.
F2	Sends contents of user-defined buffer 2.
F5	Clears buffers 1 and 2, allows character entry to buffer 1.
F6	Clears buffer 2, allows character entry to buffer 2. (Press <b>Enter</b> to end)
F9	Changes output code speed. Enter two digits, ie, 08 for 8 WPM.
F10	One minute code speed test by sending PARIS, then space, WPM times.
F11	Enter code-practice session. Sends 120, 5-letter groups. Press <b>Esc</b> key to end.
F12	Toggle sidetone on and off.

**Prosign and Numeric Key Pad Assignment****Prosign Key Morse Code**

AR	0	-----
AS	1	- - - -
KN	2	- - - - -
SK	3	----- -
BK	4	- - - - - -
SN	5	----- .
KA	6	- - - - - -

Here's the FAR Circuits version of the encoder. Provisions exist to mount the optional keying transistors and their respective components.



buffers. To insert the buffer into the CW encoder output, press **F1** for buffer 1, or **F2** for buffer 2. Also, be sure to include spaces at the beginning or end of the sequence, as appropriate, if the buffer information is to be inserted or appended to an outgoing data stream.

**QSOs**

The encoder will not continuously hold the key down (as for tune-up) or provide for nonstandard key sequences, so it's useful to have a mechanical key or switch attached in parallel with the key line. (The key can act as a backup for the encoder when that is difficult or inappropriate to use.) If the circuit's power supply is turned off and on, you'll need to reset any defaults you've changed.

As you operate the encoder, you will notice that it is important to insert spaces in

order to provide the correct timing between words. Obviously, if you are typing letters and words slower than the output speed, spacing and the use of the space bar is irrelevant. Type-ahead is allowed. You can enter up to 12 characters including spaces, ahead of the output encoding. For the ultimate in smooth output, it's necessary to maintain at least one character in the buffer, but this is difficult to do. Here are two techniques that I have found useful: Rapidly key one word at a time (no commonly used words I can think of have 12 letters), wait for the last character to be sent, then enter the next word. Another technique is to visually observe DS2, which indicates keyboard buffer status. As you type, DS2 illuminates when the buffer is three characters short of being full, at which time you should enter the last couple of characters, or a space, then stop typing.

**Table 2****Code Practice Check List**

AUG4V	RM741	G5ZSK	ADNFF
0QEAA	NTUVV	FXQMC	V33SK
6198T	FQI6H	3500W	OJK5A
NDYCA	8JJVY	51RH1	QQ91D
VN1VU	NFIP3	S02MG	XRCZS
F9F7Y	KPC9Y	F64UG	G4RFS
1OKUY	2ZREN	5BSXP	D98TM
QN5LQ	J0K1U	H250S	7A0UB
TG5WX	H5ED1	L8KMF	15ZV1
JFAC4	5HETA	EQ2YT	CPHZK
PIUTW	FS9Z8	GMG0Q	0DWDP
8B7KI	2OHWV	QQVW5	4WZUN
G1T7I	GVZVM	RC1WW	Y3FU6
7W1BY	0ULUG	D651F	LCCX4
TQOKQ	SFL1L	4961K	8EC3S
V9C6X	LDSIK	8TXER	NR3SN
YTVOA	ZDW6R	1RN3T	M9WGN
E19WB	LCXE5	6VZ5A	EZWHC
GWMLN	X34SV	37FWO	JE5CP
UKTIL	D4EK3	731WN	516II
T0BCS	PDJ7I	FE8CB	CM7OP
95T5Y	OJAS9	OIVJY	9P7A8
V3UFI	NAPCX	5C4XY	3TYFY
12B6X	ZDT9C	JF0WK	8NZHF
IS7D7	PC3G0	26HQA	2EOLO
BJGIF	W68H3	XX7Q8	XFWUP
8TUTJ	OMB3H	COVCH	FXQVZ
PY05V	H9600	G7UPW	ZBKJO
7Z17O	O7LNU	M1111	FHJY7
NSD7H	SXPYD	CCBML	ZFOCY

DS2 stays illuminated until there are only three characters remaining, at which time you can enter the next burst of text until it relights.

**Code Practice**

The microcontroller has a table of 600 letters and numbers in a fixed pseudo-random sequence that it sends in five-character groups. Pressing **F11** enables U2 to start at the beginning only, but the encoder sends this table repeatedly until you press the **ESC** key. Pressing the **ESC** key also restores all the defaults, including the 15 WPM code speed and sidetone, and clears all buffers. You can check your practice sessions against the five-character group listing of Table 2.

**Morse Code Timing**

The timing used to generate the dots, dashes and interelement spacing uses the following formulation:

T=1 Dots and space between dots and dashes

T=3 Dash and space between letters

T=7 Space between words

The value for T was adjusted so that sending the characters *PARIS* followed by a space, *WPM* times takes exactly one minute. You can test this by setting the speed then pressing **F10** at the same time you start a stopwatch or timer. The stopwatch should indicate exactly one minute when the encoded *PARIS* is sent *WPM* times, followed by a final space time and stop.

## Construction Variations

Except for U1 and its associated clock and reset circuit components are not critical. This circuit includes a reed relay to control transmitter keying because the key jack on my rig presents -60 V or more, and current levels that are unknown. A relay provides isolation from this alien vacuum tube environment and possible source of RF energy. If your transmitter's keying circuit presents a low-level positive or negative voltage (20 V or less) and draws less than 20 mA, one of the optional transistor keying circuits shown can replace K1, as shown in Figure 1.

With clever repackaging, you may be able to install the keyer components inside the companion keyboard or transmitter. Placing the keyer inside the transmitter

might eliminate the need for the added 5 V power supply, some connectors and K1.

## Summary

I'm sure you'll find this encoder a great way to enjoy many CW QSOs, or code practice. It's an easy to build and inexpensive project and proved to be a fun experiment for me! CU on CW!

## Notes

<sup>1</sup>A PC board for this project is available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269, tel 847-836-9148 (voice and fax). Price: \$4 plus \$1.50 shipping for up to four boards. Visa and MasterCard accepted with a \$3 service charge.

A programmed S87C751-1N24 for this project is available for \$20 in US, \$24 outside US. This price includes shipping and handling by surface mail. (Source code is not

available.) While supplies last, a dc-input jack (J2) will be included with orders for the IC. Contact Ron Alspaugh, W6NKS, PO Box 1534, Grass Valley, CA 95945; tel 916-273-2022. Credit card orders are not accepted.

<sup>2</sup>More details of the Morse code character set (and other codes) can be found in *The ARRL Radio Amateur's Handbook*, pp 30.33-ff.

Ron Alspaugh received his call sign, W6NKS, in 1957, when he was licensed at age 12. He obtained a BSEE in 1974 and has worked as an analog, radio and digital engineer. Ron is a staff engineer at Tektronix Inc, where—at the Grass Valley (California) products division—he designs analog and digital video products for professional producers, broadcasters and the major networks. You'll find Ron working 40, 30 and 17 meter SSB and CW. You can reach him at 14535 Penn Rd, Grass Valley, CA 95949, and via e-mail at [alspaugh@video.gvg.tek.com](mailto:alspaugh@video.gvg.tek.com).

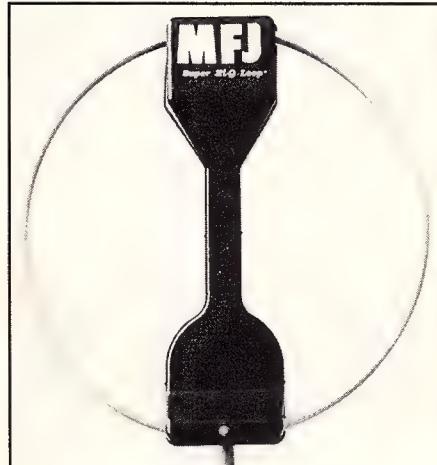
DST

# New Products

## PORTABLE 40-15 METER MINI LOOP FROM MFJ

Designed for apartment dwellers and travelers, MFJ's new 1788 "Super Hi-Q Loop" is a 36-inch, high-efficiency, remotely tuned loop that transmits and receives on 40 through 15 meters. The compact antenna features a "smart" remote-control box and power supply, automatic band selection and a built-in SWR/wattmeter. The MFJ-1788 needs no counterpoise or radials, tunes its entire range with low SWR, can be mounted vertically or horizontally and handles up to 150 W of RF. Other features include all-welded construction, pushbutton tuning and a thick ABS plastic housing that's protected against sunlight and weather.

Price: \$359.95. Backed by MFJ's "no matter what" unconditional one-year warranty, the '1788 is available from your local Amateur Radio dealer or by contacting MFJ at 300 Industrial Park Rd, Starkville, MS



39759; tel 800-647-1800; fax 601-323-6551.

## THE MICRO-JET TORCH FROM SOLDER IT

With its 2400° F pinpoint flame, Solder It's MJ-500 Micro-Jet Torch is perfect for coax connectors, field work, emergency repairs, heat-shrink tubing and other hobby and professional uses.

The ergonomically designed torch is fueled by refillable butane cells (included) or readily available disposable cigarette lighters. New features include a front trigger ignition and a chain-secured nozzle safety cap.



Price: \$24.95 plus \$5 s/h. VISA/MC accepted. For more information, contact Solder It, PO Box 20100, Cleveland, OH 44120; tel 800-897-8989; <http://www.solder-it.com>.

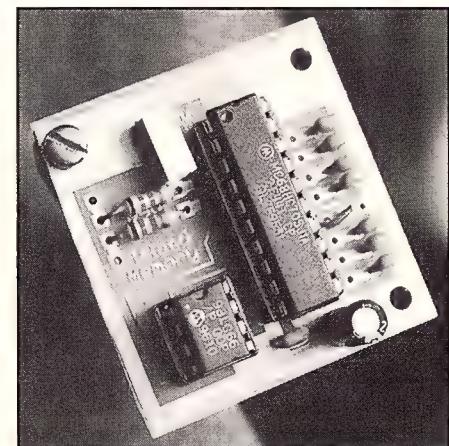
## THE ISLAND MEMORY KIT

If you'd like to add memory keyer functions to your existing keyer, consider the Island Memory Kit from Jackson Harbor Press. The PC board kit uses almost no power (5 microamps on standby) and measures just 1.5 inches square. It connects to your existing keyer via five leads: power, ground, keyer output, and dit/dah paddle outputs. The unit "listens" to your keyer and records messages in one of four 60-character memories, which are retained even when power is turned off.

The kit is compatible with keyers that are powered by 3 to 6 V dc, generate dit/dah signals via a switch closure to ground, and have keyer chips that output a positive voltage (a digital "1") when sending dits/dahs.

Price: \$17.95 plus \$2 s/h (USA). Wisconsin residents add 5.5% sales tax. For more information, contact Jackson Harbor Press, N21W1418 Foss Rd, Washington Island, WI 54246; tel 414-847-2761, e-mail [jacksonharbor@worldnet.att.net](mailto:jacksonharbor@worldnet.att.net).

DST



# The Triple Trickler

A few dollars, a bit of spare time and you'll have an easy way to keep your batteries in top shape!

**H**ave you ever had a hassle keeping your RV and portable-operation batteries charged? Do you have trouble remembering to fire up the trickle charger and then move it from battery to battery? That's the predicament I found myself in for the past several years. I have a large, deep-cycle lead-acid battery for my camping and Field Day radio operations, one more for the pop-up camper, and a smaller motorcycle battery that I also use for portable operations. After suffering a premature failure of one of my batteries (which I attributed to letting it become discharged over a long period of time), I decided to automate my trickle charging. Now, I just plug in a wall charger, hook up the batteries and forget about them for months at a time!

## Triple Trickler Circuit

Figure 1 is a schematic of the circuit I developed to continuously cycle a single dc source from one battery to the other to keep each battery up to snuff. The system consists of a power source (in my case, a dc-output wall transformer or "wall wart"), the controller (the Trickler) and the batteries to be charged. The controller continuously switches the dc power source from one battery to the next.

The controller can be built to handle up to 10 batteries, but remember: Each battery shares an equal amount of charger time. This means that if the system is set up to service three batteries, each one gets charged *one-third* of the time. A 10-battery system allows each battery to be charged only one-tenth of the time. This may not be enough to keep the batteries fully charged.

In Figure 1, a CD4017 decade counter (U3) counts the clock pulses fed to it. Initially, the first digit (pin 3) is high. On receiving the next clock pulse, the second digit (pin 2) goes high and pin 3 goes low. On the next pulse, the third digit (pin 4) goes high, and so on, until all 10 digits are counted, then the process repeats. By using a jumper connected to U3 pin 15, the count can be controlled to set the restarting point. The other end of the jumper is connected to the U3 pin (7, 10, 1, 5, 6, 9, or 11) representing the digit that is *one higher* than the

number of batteries to be charged. For three batteries, I wanted the count to go to three, so the jumper is shown connected to the fourth digit, pin 7. (Four batteries require connection to U3 pin 10, and so on, with pin 11 representing the highest number, 11, for use with 10 batteries.)

The clock pulse to U3 is provided by the output of U2, a 555 timer. U2's output frequency is set by the time constant determined by the values of R1 and C5. With R1 at 10 MΩ and C5 at 100 µF as shown, U3 provides an output pulse approximately every 13 minutes. This means U3 will sequence to the next digit every 13 minutes, and a complete cycle of three digits takes 39 minutes before starting over. Larger values for R1 and/or C5 will increase the length of time for each output. Electrolytic capacitors, such as C5, have a wide tolerance, so depending on the actual value of C5, the timing could vary considerably from the specified 13 minutes, but it is not at all critical.

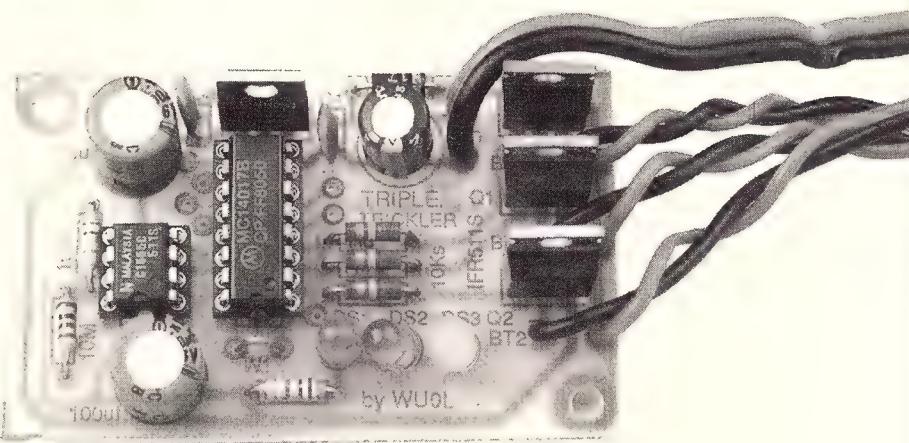
Three outputs of U3 turn on an IRF511 MOSFET (Q1, Q2 or Q3) that completes the charging circuit for each battery by providing a connection to ground. An LED (DS1, DS2 and DS3) on each of the three outputs of U3 provides a visual indication of the charging sequence. MOSFET devices have a very low turn-on resistance. Therefore, very little heat is generated by Q1 through Q3. My power supply will charge the battery at up to 500 mA when

first connected to a low battery. At this rate, the tab on an IRF511 does not even get warm to the touch and no heat sinking is necessary. At higher charge rates, it may be wise to heat-sink these devices if any sign of heating is detected. The IFR511 is rated at 3 A continuous duty.

U1 provides a constant 12 V to U2 and U3. Its main function is to protect U2 and U3 from voltages exceeding their ratings because the open-circuit power supply or wall transformer output voltage may exceed the 16 V rating of U2 and U3. D1 prevents the batteries from back-feeding the circuit if the power supply is disconnected. D1 is a Schottky diode. A Schottky is chosen to keep the forward voltage drop low. If your power supply provides plenty of voltage, an ordinary rectifier diode can be substituted. The wall charger I use has a rated output of 15 V dc at 400 mA.

## Construction

The circuit can be built in most any fashion. A PC board is available,<sup>1</sup> but you can use perf board, too. During assembly, take



<sup>1</sup>A PC board for this project is available from FAR Circuits, 18N640 Field Ct, Dundee, IL 60118-9269, tel 847-836-9148 (voice and fax). Price: \$4 plus \$1.50 shipping for up to four boards. Visa and MasterCard accepted with a \$3 service charge. (Visit the FAR Circuit's Web site at <http://www.clais.net/farcir/> to see a catalog of other available PC boards.—Ed.)

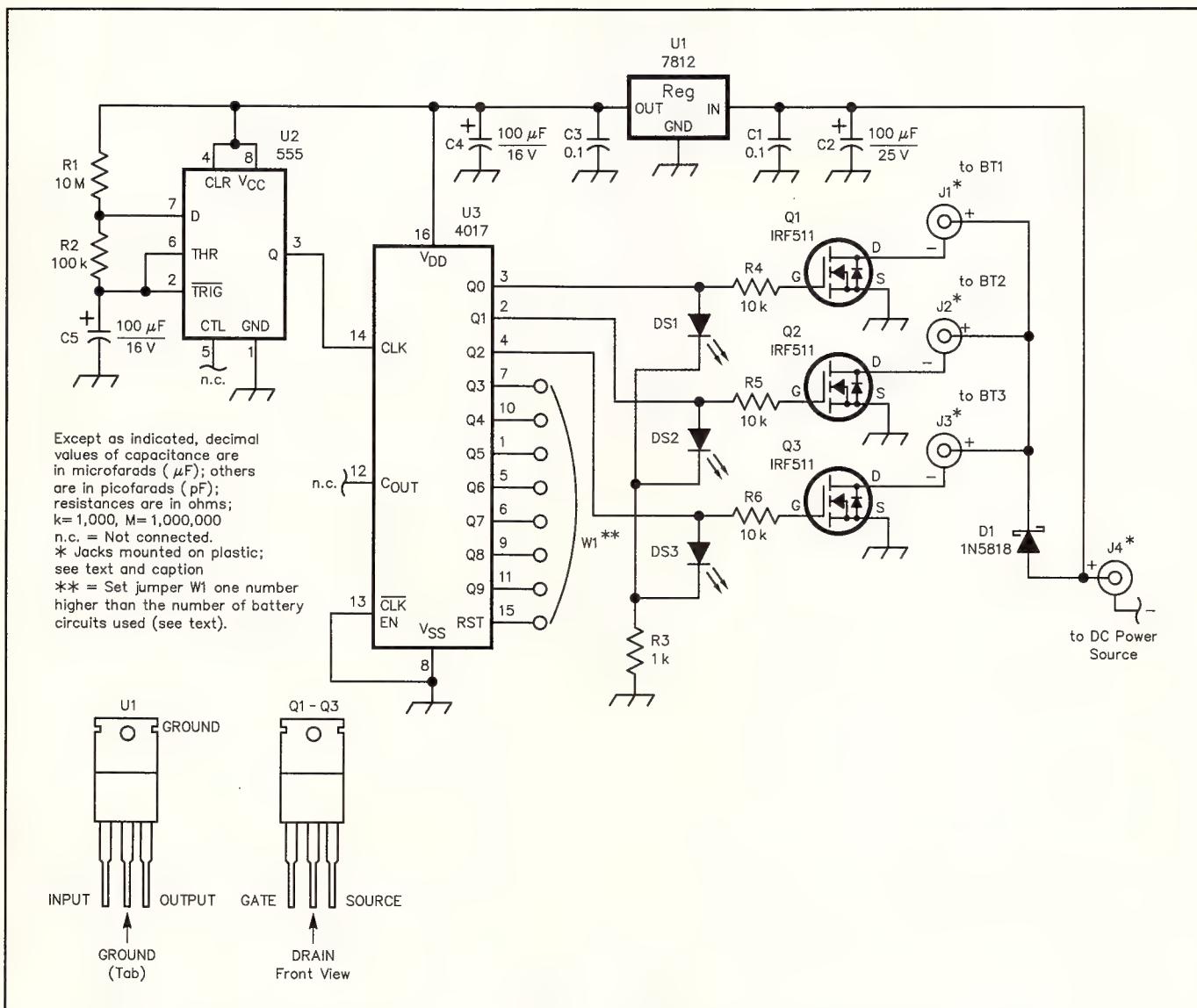


Figure 1—Schematic of the Triple Trickler circuit. J1 through J3 are insulated from ground by mounting them in a plastic box. Mating plugs connect Q1 through Q3 to their respective batteries. Part numbers in parentheses are Mouser; equivalent parts can be substituted (Mouser Electronics, 2401 Hwy 287 N, Mansfield, TX 76062, tel 800-346-6873, 817-483-4422; fax 817-483-0931 e-mail [sales@mouser.com](mailto:sales@mouser.com); <http://www.mouser.com>). Unless otherwise specified, resistors are  $1/4\text{ W}$ , 5% tolerance carbon-composition or film units.

C2—100  $\mu\text{F}$ , 25 V (#539-SKR25V100)  
 C4, C5—100  $\mu\text{F}$ , 16 V (#539-SKR16V100)  
 D1—1N5818, 1-A Schottky diode (#583-FM5818)  
 DS1-DS3—Small red LED (#512-MV57774C)  
 J1-J4—Dc power jacks, 2.5 mm ID,

5.5 mm OD (#163-4025); do not use jacks equipped with internal, normally closed switches.  
 P1-P4—Mating plugs (not shown) for J1-J4 (#172-4201). These plugs have pre-attached 72 inch long wires.  
 Q1-Q3—Power MOSFET (#333-IRF511)

U1—7812, 12 V, 1 A positive regulator (#511-L7812CP)  
 U2—555 timer (#511-NE555N)  
 U3—4017 decade counter (#511-4017BM)  
 Misc: enclosure (Radio Shack 270-223; see text); dc panel-mount jacks; mating dc cable plugs; hardware; wall transformer.

the usual precautions to protect Q1 through Q3 and U3 from static discharges.

The controller can be mounted in a plastic case commonly available from Radio Shack or other electronic parts suppliers. I used a plastic box with external dimensions of approximately 2x3x6 inches (HWD); it provides more than ample room. Coaxial power jacks and connectors attach the wall transformer to the controller and the controller to the batteries. Using a plastic enclosure ensures J1 through J3 are isolated from ground.

I made provision in my unit to be able to

charge a fourth battery (should I acquire one) by installing a fourth IRF511 (Q4) and associated circuitry (not shown in the schematic). Now, if I want to activate the fourth charging circuit, all I have to do is move the jumper from U3 pin 7 to U3 pin 10, and connect another jumper from U3 pin 7 to the junction of the added 10  $\text{k}\Omega$  resistor (R7) and LED (DS4).

Testing is easy. Using jumpers, connect a 100  $\text{k}\Omega$  resistor in parallel with R1. This decreases U1's timing cycle to 22 seconds. (This is done so you don't otherwise have to wait 13 minutes to check each clock

pulse!) Apply power from your power supply and you should see one of the LEDs light up. In approximately 22 seconds, that LED should extinguish and the next LED light up, and so forth in a continuous cycle. Then connect the batteries. With your VOM in the ammeter mode, check that each battery is getting a charging current as its associated LED lights. Then, disconnect the temporarily added 100  $\text{k}\Omega$  resistor and the unit is ready for service.

If your power supply delivers more voltage than you need, insert one or more diodes in series with the lead to the control-

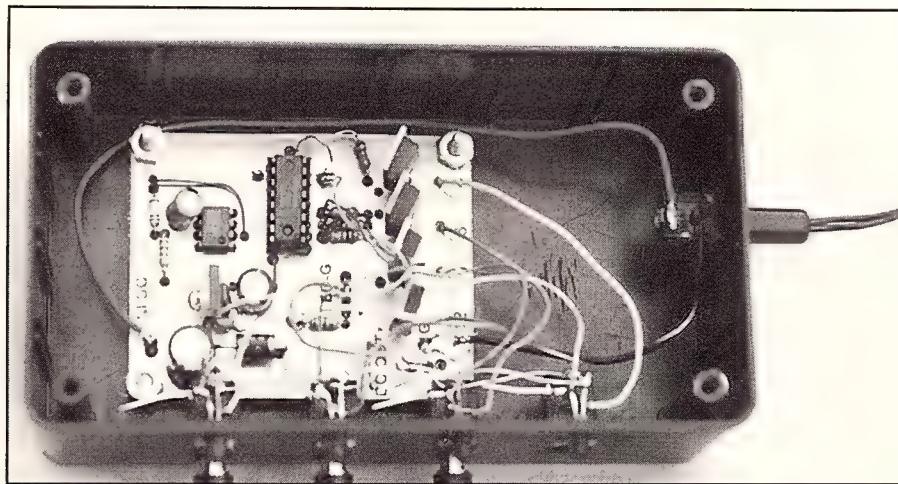


Figure 2—This inside view of the Trickler prototype shows the fourth MOSFET, LED and output connector mentioned in the text. The dc connectors on the front panel are those I had in my junk box; suitable connectors are identified in the parts list of Figure 1.

ler. Each silicon diode added provides approximately a 0.7 V drop when conducting in the forward direction. This will lower the charging current. When my batteries are in good shape, my 15 V dc wall charger

charges them at about 300 mA, and their resting voltage is about 13.5 V, which is close to optimum. If you use a wall transformer, be sure it provides a *dc* output. Some wall transformers deliver *ac*. To use

an *ac*-output transformer, you'll have to add a rectifier circuit.

### Summary

Remember: This unit should be used only for *trickle* charging. When you discharge your batteries on a field expedition, first recharge them using your regular battery charger. (Also, you may want to top them off with your standard battery charger before major usage is contemplated.) In between, however, you can rest assured that your batteries are kept in good condition by connecting them to the Trickler. My unit has been in service several months now and it is a delight! I just connect it and forget it!

*Mark L. Meyer, WU0L, was first licensed in 1965 as WN0NSY when he was a high-school senior. He homebrewed his first transmitter and has been homebrewing ever since. Mark graduated with a BSEE from South Dakota School of Mines and Technology in 1970, and has worked in hydroelectric power generation and transmission since then. Mark is currently involved in the operation of the high-voltage electric grid in the western United States. You can contact him at 14153 W First Dr, Golden, CO 80401, e-mail wu0l@aol.com.*

**QST**

## New Products

### 2 W AND 5 W RF LOADS FROM BIRD

◊ Bird's new T-series of RF loads—which include 2 W and 5 W models—are conservatively rated 50-ohm, air-cooled loads that perform well to 6 GHz. Manufactured with non-magnetic materials and finished in silver or tri-alloy plating, connector options include N-type, BNC and TNC. Maximum SWR is 1.25:1 from 1 to 6 GHz.



Price: 5 W, \$60; 2 W \$49. For more information, contact Bird Technologies Group, 30303 Aurora Rd, Cleveland, OH 44139; tel 216-248-1200, fax 216-248-5426, e-mail [sales@bird-electronic.com](mailto:sales@bird-electronic.com).

### CALL SIGN EXTENSION PLATE FROM W1TK

◊ W1TK's call sign extension plates attach to your car's license plates and are similar to those used by volunteer fire departments and other public service groups. White with black letters, the plates are 12

inches long (the same as your license plate) and extend three inches above or below your existing plate.

Price: \$10 plus \$3 S&H. ARES, RACES and club inquiries are welcome. For more information, contact Ron Wakefield, W1TK, Signs by Ron, 64 Neal Ct, MicroDyne Office, Plainville, CT 06062; tel 860-632-1070.

### THE MICRO DTMF DECODER FROM OTOELECTRONICS

◊ Compact, rugged and affordable, Optoelectronics' Micro DTMF Decoder features a 12-character LCD display, an internal mike to decode DTMF tones produced by radio or tape recorder speakers, an audio input jack, a 2000-character non-volatile memory and 100-hour operation from a single AA battery.

The Micro DTMF has three program controls (Read Data, Recall Data and Off) and two pushbuttons to scroll data. It decodes DTMF tones at up to 12.5 characters per second, measures 2.8×1.9×1.1 inches and weighs only 3 ounces.



Price: \$89. For more information, contact Optoelectronics, 5821 NE 14th Ave, Ft Lauderdale, FL 33334; tel 954-771-2050, fax 954-771-2052.

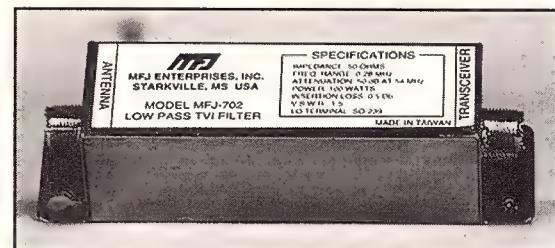
### A 200-W LOW-PASS FILTER FROM MFJ

◊ With a claimed insertion loss of only 0.5 dB, MFJ's Model 702 low-pass filter will reduce transmitter harmonics above 54 MHz by up to 50 dB.

The filter's SWR is better than 1.5:1 from 1.5 through 30 MHz (in 50-Ω coaxial systems), and the compact unit (about 6×1×1.5 inches) comes with SO-239 connectors and handles up to 200 W of RF.

Price: \$24.95. Backed by MFJ's "no matter what" unconditional one-year warranty, the '702 is available from your local Amateur Radio dealer or by contacting MFJ, 300 Industrial Park Rd, Starkville, MS 39759; tel 800-647-1800; fax 601-323-6551.

**QST**



# An Ultra-Simple Receiver For 6 Meters

Here is a simple VHF receiver you can build without any special components or test equipment.

This receiver uses superregeneration for high sensitivity and low parts count. It can receive both FM and AM modulated signals. This design differs from previous superregenerative circuits because it uses a "quench waveform" control to allow the reception of narrow-band FM. Receiver sensitivity is around 1  $\mu$ V. Builders can easily modify the radio to operate over a wide band of VHF. It is inexpensive (about \$20), can be built quite compactly and powered from a 9 or 12 V battery.

The performance of this rig does not equal that of modern commercial transceivers, but you can build it yourself and be monitoring all types of local communications in a few hours. This includes 6 meters and the adjacent frequencies. With easy modifications, you can receive police, snowplows, fire stations, telephone paging, maintenance crews, etc on VHF. This receiver is also useful for low-power wireless data links. As with any regenerative set, you will need practice and patience in learning to adjust the receiver's controls for best performance.

## Regenerative Receivers

Regenerative receivers use a special type of detector that is essentially a user-controlled oscillator. In a straight regenerative circuit, the input signal couples to the detector, and some of the output signal is fed back to its input, in phase. This repeatedly amplifies the input signal. The result is very high gain in a single stage. If we allow the feedback to go past the point of oscillation, the circuit's gain stops increasing and starts decreasing, as most of the transistor's energy works to maintain the oscillation. Some type of regeneration control is necessary, so that you can keep the feedback at a point just short of oscillation. Using this technique, a single transistor or JFET can achieve circuit gains of 20,000 easily.

The superregenerative circuit uses an oscillating regenerative detector that automatically stops or "quenches" the oscillations periodically. This allows the input signal to build up to the oscillation point repeatedly, providing single-stage gains close to 1 million, even at UHF. These detectors can use two approaches for the required quenching: Either a separate lower-frequency oscillator supplies the quenching signal (*separately quenched circuitry*), or a single JFET can produce both oscillations (*a self-quenched circuit*), as shown here.

### A Superregenerative Receiver for 49 to 55 MHz

The circuit shown in Figure 1 consists of an RF stage, a superregenerative detector and an audio amplifier. The common-gate RF stage, Q1, provides RF gain and helps prevent the receiver from radiating its signal out the antenna.

The detector, Q2, operates as a grounded-gate oscillator. C4 applies in-phase feedback between the JFET's source and drain. RFC2 raises Q2's source above ground (at RF) enough for oscillation to take place.

R3 provides bias for the JFET and, together with an RC network, provides the necessary quenching oscillations. The time constant set by C8A, C8B, R7 and bias resistor R3 is deliberately made long enough

so that the dc-bias level across R3 increases until it inhibits the oscillating detector. The bias voltage then discharges through the network until the bias is low enough for oscillations to start again. This creates the necessary quenching action that produces the superregenerative effect.

The received signal from the RF stage couples to the detector through a small "gimmick" capacitor made by twisting together two one-inch-long pieces of #20 AWG insulated hook-up wire. You can also use a 1 or 2 pF mica capacitor in place of the gimmick.

The detector's operating voltage is set by the 10  $k\Omega$  **REGENERATION CONTROL**. This control affects both sensitivity and selectivity. Because the detector is a modulated oscillator, it generates a double-sideband signal. Increasing regeneration (more voltage applied to the detector) increases sensitivity but also generates greater sidebands that reduce selectivity (the sidebands interfere with a narrow-band signal).

The **QUENCH-WAVEFORM-ADJUST** potentiometer, R7, adds a small resistance in series with C8 that changes the quench waveform from its normal sawtooth shape to a sine wave. A sine wave is a much



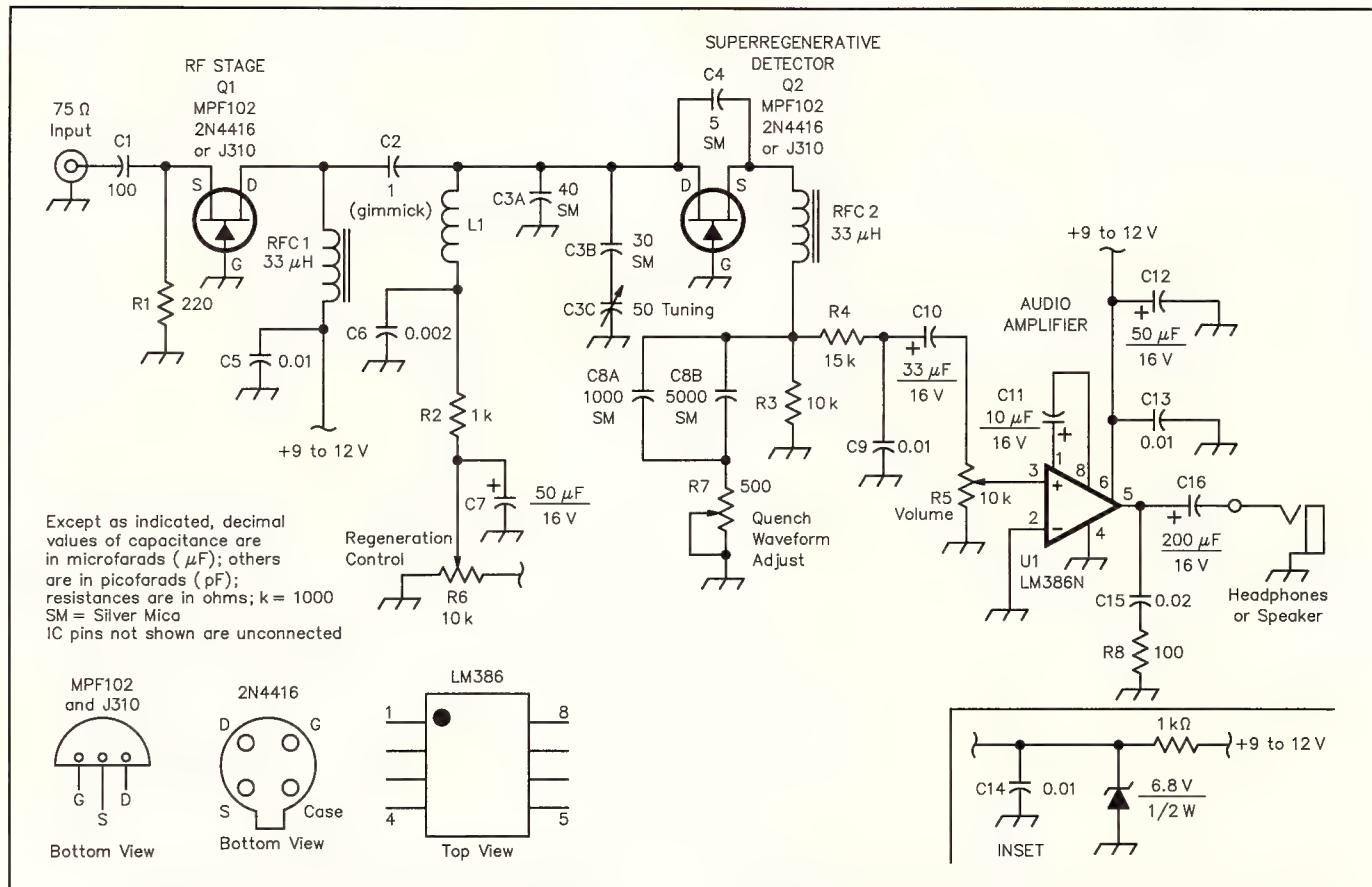


Figure 1—Schematic of the VHF receiver. Unless otherwise specified, use  $1/4$  W, 5%-tolerance carbon composition or film resistors. Equivalent parts may be substituted. Digi-Key Corp, 701 Brooks Ave S, PO Box 677, Thief River Falls, MN 56701-0677; tel 800-344-4539 (800-DIGI-KEY), fax 218-681-3380; URL <http://www.digikey.com>

C2—Gimmick capacitor (see text)

C3C—50 pF variable

C7, C12—50  $\mu$ F, 16 V electrolytic

C10—33  $\mu$ F, 16 V electrolytic

C11—10  $\mu$ F, 16 V electrolytic

C16—200  $\mu$ F, 16 V electrolytic

L1—7 turns, (air-core) #14 AWG solid copper wire space wound  $\frac{3}{4}$  inch long on a 0.25 inch form (a pencil).

R6—10 k $\Omega$ , 10-turn pot

RFC1, RFC2—33  $\mu$ H

(Digi-Key M7330-ND)

cleaner waveform (with fewer harmonics) than a sawtooth, so the sidebands are smaller and selectivity is much better. The oscilloscope photos of Figure 2 show the quenched RF envelope of the receiver with and without R7.

A simple low-pass filter (R4 and C9) removes the quench voltage from the detector's audio output. The output of the detector drives an LM386 audio-amplifier IC.

The receiver can be connected to a discone or other  $75\ \Omega$  antenna via coax cable, or you can use TV twinlead cable to make a folded-dipole antenna. For a 6 meter dipole, use a nine-foot length of  $300\ \Omega$  twinlead for the antenna. Solder the two wires at each end of the twinlead together, then cut one of the two twinlead wires in the center of its length. Solder the transmission line, a second piece of twinlead, to the cut ends at that point (solder two places). A good antenna greatly increases the number of narrow-band stations you can receive.

## Construction

Stray circuit capacitances and multiple

ground paths can prevent the detector from oscillating. It is vitally important that the detector's tuning coil (L1) be located away from other conductive objects—particularly chassis ground, the bottom and sides of the equipment box and any other metal object.

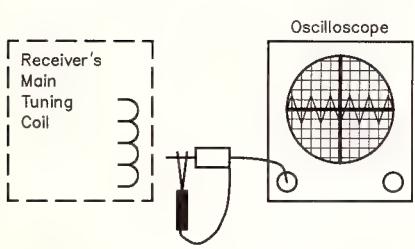
Avoid mounting the tuning coil on a printed circuit board: This loads the detector so that it fails to oscillate properly, if at all. A hand-wired universal breadboard works fine as long as the detector coil mounts well above it, or you can just use a piece of copper-clad board and some terminal strips (ie, solder lugs). Suspend the components above the board on the lugs, or you can use the parts that have grounded leads as standoffs to hold the other components above the board. (Some call this "dead bug" or "ugly" construction.)

Put the completed circuit inside a small box or use a block of wood and a piece of metal for the front panel. If you plan to place the entire receiver inside a closed metal box, build the circuit outside the box first, and be sure it oscillates properly before placing it inside.

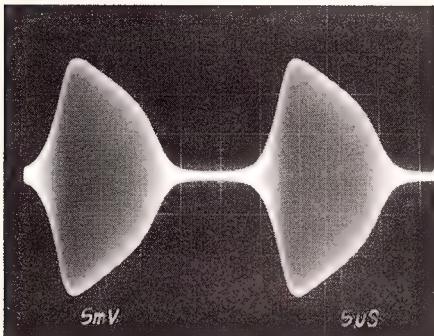
It is very important to mount the **TUNING** capacitor, C3C, directly onto the board and pass its shaft through an oversized hole in the front panel: Avoid mounting it directly to a metal front panel. If the capacitor's frame contacts both the front panel and the ground plane, it creates a multiple ground path (ground loop), which usually prevents the detector from oscillating. Mount all other controls directly on the front panel and connect them to the board using the shortest leads possible. Use shielded wire to connect the **VOLUME** and **QUENCH WAVEFORM ADJUST** controls to the PC board. You can connect the **REGENERATION CONTROL** to the circuitry with a twisted pair of wire leads. Connect C13 directly to U1, pin 8.

I recommend a 10-turn potentiometer for the **REGENERATION CONTROL** and a reduction drive for the **TUNING** capacitor. These make the receiver much easier to operate.

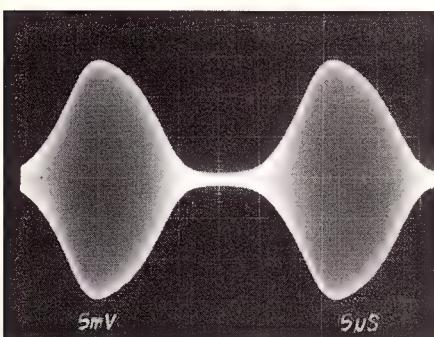
Always build receiver circuits backwards. Start with the audio stage. Build the circuitry from the speaker to the **VOLUME** control. Then test the stage by turning the



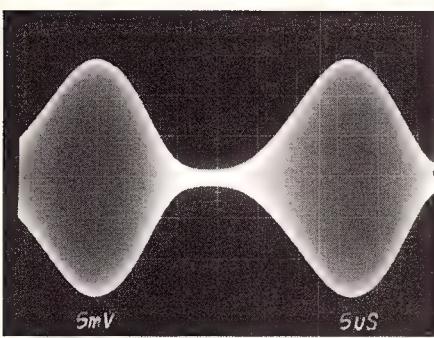
(A)



(B)



(C)



(D)

Figure 2—The effect of **QUENCH WAVEFORM ADJUST** control on the shape of the detector's oscillation waveform. A shows the test arrangement. The oscilloscope was coupled to the receiver by connecting the probe's ground clip to its tip and placing the probe tip near the receiver's main tuning coil. B, C and D show the waveforms with R7 set to 0, 250 and 500  $\Omega$ , respectively.

**VOLUME** control to midrange and placing your finger on the wiper (listen for a buzz). (In this test, your body serves as an antenna for the radio to pick up the noise from surrounding ac wiring. If you have no ac power, the test won't work. Then you'll need an audio signal source.—Ed.) If there's no sound, recheck the wiring or use a voltmeter to troubleshoot the problem. Be sure the supply voltage is present and that the voltage on pin 5 of the LM386 is half of the supply voltage.

After the audio stage is working, wire the detector, but leave out C2. Now, with no load on the detector, set R7 to midrange and turn-up the **REGENERATION CONTROL**, R6, until oscillation starts. (You should hear a loud rushing noise that indicates that the detector is superregenerating.)

RFC2 is the only component in the receiver that is at all critical. Since individual component layouts (and RF chokes) will vary, you may need to do some experimentation to get the detector oscillating properly. With a 5 pF value for C4 and the 33  $\mu$ H RF choke specified (Digi-Key part number M7330-ND), the detector should oscillate strongly. If it doesn't, check the wiring very carefully. If the wiring is okay, try changing the value of the RF choke.

Here's how to do it with an RS 273-102C RFC: First, unsolder one end of the choke winding from its lead. Remove (unwind) about 15 turns. Connect this unwound end to Q2's source and the other end to the junction of R3 and R4. Switch the radio on. Does it oscillate? If not, unwind more turns with the set operating, a few at a time, until there's a strong oscillation. Then, kill the power. Bend the coil's free end over to its lead, solder it in place and cut-off the extra wire. Connect the lead to Q2 and do a final test.

### Miscellaneous

For optimum sensitivity from this receiver, use a fresh battery. A 9 V transistor radio battery is fine for portable use. Two series-connected 6 V lantern batteries will operate this receiver for many months.

You can expand or reduce the receiver's tuning range by varying the values of C3A and C3B. C3B sets the total tuning range, so you can use different values of tuning capacitor other than the 50 pF specified. Make C3A's value greater to lower the tuning range. Likewise, you can compress or expand the turns on the main tuning coil for the same effect.

### Operation

For the best performance, this receiver needs to have its regeneration level reset every time its tuning changes. The **REGENERATION CONTROL** changes the voltage that powers the detector. Higher detector voltages increase sensitivity but they broaden the selectivity.

In these self-quenched circuits, the **REGENERATION CONTROL** also varies the

quench frequency. For AM and wide-band FM reception, set R7 (**QUENCH WAVEFORM ADJUST**) for minimum resistance and simply increase the **REGENERATION CONTROL** past the detector's oscillation threshold to a point where the background (mush) noise suddenly begins to increase rapidly. Then decrease the **REGENERATION CONTROL** setting slightly.

For narrow-band FM reception, set R7 (**QUENCH WAVEFORM ADJUST**) at mid-scale, adjust the **REGENERATION CONTROL** for strong oscillation (high sensitivity) and tune in the carrier of the desired station. After tuning to the center frequency of the carrier, decrease the regeneration level until the audio level increases sharply. (If you decrease the level too much, the detector will squeal.) Adjusting R7 (**QUENCH WAVEFORM ADJUST**) creates a narrow-band window on the **REGENERATION CONTROL** between the point where the detector first begins to oscillate and the point where (narrow-band) audio begins to drop off rapidly. Increasing R7's resistance widens this region but decreases detector sensitivity. Because of their interaction, the **REGENERATION CONTROL** and the **QUENCH WAVEFORM ADJUST** control need repeated adjustment for narrow-band FM reception.

You can copy CW and SSB with this receiver. Set the **REGENERATION CONTROL** to a low point, where the detector stops superregenerating, but where it is still oscillating. The receiver now operates as a straight regenerative set.

You can easily convert this receiver to operate on other bands. For 2 meters, make the following component changes: Omit C8A and C3A, change C3B to approximately 15 pF, change C3C to a 25 pF variable capacitor, change C4 to 2 pF, and change RFC1 and RFC2 to 15  $\mu$ H; L1 is 3 turns, 1 inch long. Add a 1 k $\Omega$  resistor and 6.8 V Zener diode before the **REGENERATION CONTROL** (see Figure 1 inset) for increased stability on the higher bands, but that's not needed at 6 meters.

*Charles Kitchin is a hardware applications engineer at Analog Devices Semiconductor Division in Wilmington, Massachusetts, where he has been employed for the past 21 years. His main responsibilities include customer applications support and writing technical publications such as application notes and data sheets. He has published over 50 technical articles and two applications booklets. Chuck graduated with an ASET from Wentworth Institute in Boston, and afterward spent many years studying electrical engineering at the University of Lowell's evening division. Chuck has been an avid radio builder and shortwave listener since childhood and a licensed radio amateur (Tech Plus) for two years. His other hobbies include astronomy, beer brewing and oil painting. You can reach Chuck at 804 Woburn St., Wilmington, MA 01887; tel 781-937-1665, fax 781-937-2019; e-mail Charles.Kitchin@analog.com.*



# SAREX: Looking for Tomorrow's Scientists Today

It's

an early 6 AM on September 22, 1996, and a crowd of more than 200 people is gathered in Andover Middle School's cafeteria to watch students talk to an astronaut. School-age kids are thrilled by these encounters, but today's event is truly out of this world. Instead of hosting a NASA presentation in the gym, this astronaut is orbiting the Earth in a space shuttle! The experience is part of the ongoing "Shuttle Amateur Radio Experiment," better known as SAREX.

A deep voice advises, "On the mark, it will be 6:15 ... mark!" Nervous eyes glance at watches. Attendees, many who have limited knowledge of Amateur Radio, sit quietly, eyes fixed on an array of radio equipment and a line of waiting students. We know something wonderful is about to happen!

"N5QWL, N5QWL, N5QWL," comes the voice from NASA's South Africa control center—and then the reply ... "This is N5QWL." From his space shuttle, orbiting several hundred miles above the Earth's surface, astronaut Jay Apt, N5QWL, is chatting with Andover's kids ...

By the time our school's segment was over, some 20 student questions were asked and answered. Students, parents, patrons, media representatives and ham operators shook hands, patted each other on the back and shared some tears and hugs of excitement and relief. The Andover Middle School SAREX contact with Jay Apt, aboard the space shuttle *Atlantis*, mission STS-79, was a smashing success.

Through the remainder of the school year, my middle school students and I reminisced about our special September morning. We shared the excitement of being photographed, having stories written about us and being in the limelight. But just as September fall leaves change color, our Amateur Radio focus changed directions.

Instead of preparing for another SAREX contact, we had new goals of building QRP kits, operating via slow-scan television and improving our Morse code skills for Field Day '97.

Mid-April arrived and found an excited bunch of students preparing for spring

As these Kansas students will discover, the Shuttle Amateur Radio Experiment, one of ham radio's premier youth programs, is not only larger than life—it can *change* lives. Tomorrow's astronaut corps will certainly include SAREX participants...perhaps one or two from this Midwestern town.



Jay, students and parents on their way to a special pizza party lunch.

break. As members of the ham radio class sat in the cafeteria enjoying birthday treats, a colleague tapped me on the shoulder and whispered, "Missy, you have an important phone call in the office."

I left my co-worker to watch over the class and hurried to the school office. The school secretary looked at me with bewildered eyes and remarked, "Missy, someone from NASA would like to talk to you."

"Yeah, right," I replied.

"Missy, it's really NASA."

Nervously, I picked up the phone.

"Umm....Hello? This is Missy."

The next thing I knew was that Jay Apt, N5QWL, the astronaut my students talked to during the *Atlantis* mission, was going to spend the day with us on May 16. My students had a new mission: to make May 16 a memorable "Jay Apt Day" in Andover, Kansas!

## Preparations

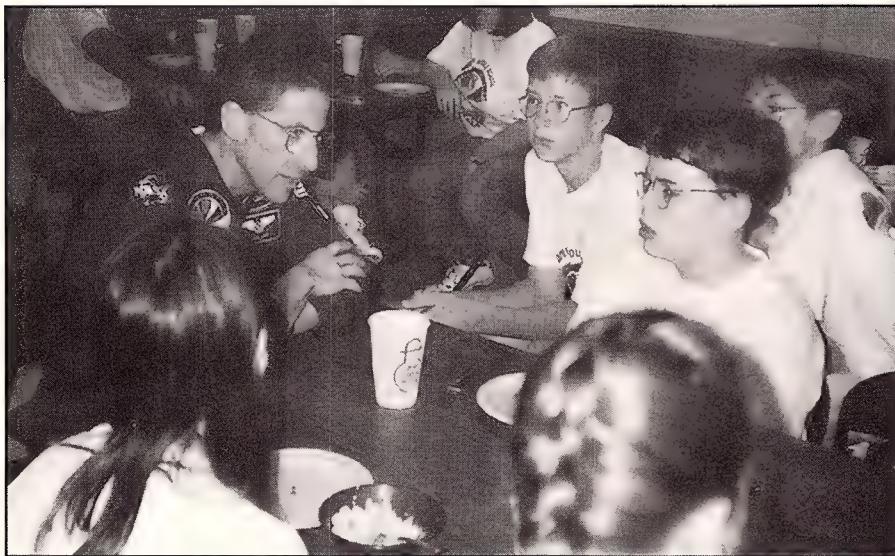
As we met to discuss preparations, our task list included: securing the funds to pay for Jay's expenses; asking Andover's

mayor to proclaim May 16, 1997, as "Jay Apt Day"; contacting parent volunteer groups for assembly decorations; planning and developing student activities; providing meaningful gifts for Jay; notifying local news outlets; and asking local businesses to change their signs to read, "Welcome Jay Apt."

At the suggestion of Dr Linda Hope, the school principal, I contacted our vending machine provider to "cash in" our Coca-Cola Edu-credits, a fund designed for student activities. Additionally, Andover Mayor Dennis Bush assured us that the town's Commerce and Tourism committee would handle the remaining expenses. Mayor Bush would be at the assembly to make the proclamation in person, and to present Jay with a special "key to the city" made just for the occasion.

The parent volunteers chose a patriotic theme for event decorations that included red, white and blue balloons and streamers. Additionally, the volunteers contacted NASA for Jay Apt promotional materials.

Because the end of the school year



Astronaut Jay Apt, N5QWL, meets the students he chatted with during his *Atlantis* mission.

would soon be upon us, we wanted a light and fun approach to preparing the student body for the event. During morning announcements, for example, NASA/Jay Apt trivia facts were announced. And homeroom teachers shared Jay's NASA biographical information with their students. As the important date approached, classes worked as teams to answer as many trivia questions as they could. Prizes (cans of soda) were awarded to the winning classes.

The students decorated posters to greet Jay as he arrived at the school. Some posters, drawn by science students, depicted the fine details of a space shuttle. Others, on the humorous side, showed Jay shaking hands with a variety of well-drawn aliens.

To complement the mayor's "key to the city," the students put together a personal scrapbook entitled, *Jay Apt, This is Your Life!* which was developed by student artists and written and illustrated for Jay's young daughters' enjoyment. Not to be outdone, the ham radio students thought Jay needed a new Amateur Radio cap, so they gave him a flashy Hawaiian print cap personalized with "JAY N5QWL" in bold blue letters.

### Incoming Astronaut!

The big day finally arrived, and fellow teacher Kurtis Boughton, NØUGJ, shared the excitement with me as we drove to the airport to pick up our guest. Jay, an avid pilot, chose to fly his Beechcraft *Bonanza*. Casually dressed in jeans, Jay carried a small knapsack and a laptop computer. "Missy," he reassured, "don't worry. I've packed my blue flight suit."

Jay's schedule was hectic as he toured our school's technology lab, Amateur Radio classroom and building facilities. His first task was to teach the Introduction to Amateur Radio class about radio wave propagation. Jay's "pupils" included 20 middle school students, a group of local hams—and a bunch of reporters!

A short while later, a class of Andover

### SAREX Resources

If you'd like to participate in a future SAREX mission, whether as a school teacher or technical helper, call the ARRL's Educational Activities Department at 860-594-0301, or point your Web browser to <http://www.arrl.org/sarex>, HQ's informative SAREX Web site.

Because future shuttle missions will mainly be dedicated to bringing parts of the International Space Station *Freedom* into space, there will likely be only one SAREX mission in 1998, and one in 1999. Details on any possible SAREX missions will be posted on the SAREX Web page as soon as they become available. (When *Freedom* is orbiting and operational, opportunities for astronaut/student contacts will increase dramatically.)

second-graders, taught by Carol Musick, KBØONM, talked with Jay via the local El Dorado repeater (WØRGB). The 10-minute contact was filled with a variety of questions, including the traditional "How do you go to the bathroom?" query.

Next stop? Lunch! Jay was whisked off to a school bus with the nine students who had talked to him during the STS-79 mission. The destination was Andover's Big Cheese Pizza for the all-you-can-eat noon buffet. While the students wolfed down stacks of pepperoni and supreme pizza slices, Jay went from table to table, talking with each student (which probably helped to keep his trim astronaut waistline!).

Jay's concluding task was the grand finale: addressing the middle school assembly. As the auditorium filled with nearly 700 students, I quickly prayed that everyone would behave properly. (After all, it was the end of the school year, and some students had already decided that the year had been over for a few weeks!)

As the house lights were lowered, I was left on the stage amidst helium-filled red, white, and blue balloons. After my eyes adjusted to the spotlights, I glanced around the auditorium. Everybody who had supported our school's Amateur Radio program was there: my husband, Fred Hollenbeck, NØWSA; my dad, Gary Hoffsommer, WØTI; numerous ham radio friends; students; parents; community members; teachers; and school administrators.

A hush fell across the auditorium as I gingerly turned on the microphone.

"Five years ago," I began, "a small group of students and I had a dream. The dream was to explore technology by the means of an Amateur Radio club. Little did we know that forming our charter club would lead to today's celebration.

"The club would not exist today without the help of some very special people. 'We need equipment!' was our call, and Ronald and Martha Robb [WDØBOC, KAØPCE] answered, believing in the students and me. They donated top-notch Amateur Radio equipment to start our school club. Ronald and Martha, this celebration today is happening because you care about kids. Thank you.

"We also have some other special guests in the audience today: members of the Flint Hills Amateur Radio Club, the Wichita Amateur Radio Club, and the Boeing Employees' Amateur Radio Society. These people have supported our club's mission from the very beginning.

"On September 22, 1996, a crowd of more than 200 people gathered in the school cafeteria to experience the 'Shuttle Amateur Radio Experiment,' better known as SAREX. Excitement filled the airwaves as our scheduled time arrived to talk to an astronaut aboard the space shuttle *Atlantis*.

"After more than 20 student questions were asked and answered, we honestly thought that the event was a part of history. Little did we know that the SAREX event was only the beginning.

"Today, I proudly present to you the astronaut that we talked to on that memorable day in September. Ladies and gentlemen, a real American hero, astronaut Jay Apt, N5QWL!"

Tears welled up in my eyes as Jay, dressed in his blue flight suit, proudly walked out on the stage, shook my hand, and received his gifts from the city and students. As video cameras rolled, camera flashes sparked and students enthusiastically clapped, I knew that today's events would make a difference in so many students' lives. We might not notice the changes today, but someday, thanks to the clarity of hindsight, the marks made by SAREX and Andover's day with Jay Apt will be crystal clear.

*Michelle Hollenbeck, AAØOP, is a teacher at Andover Middle School, 1628 N Andover Rd, Andover, KS 67002, e-mail aa0of@feist.com; http://www.feist.com/~aa0of*

*All photos by the author.*

# The Digital Audio Radio Service

With FCC licenses in hand, two companies are racing to deliver nationwide, CD-quality music and talk programming to your car radio via satellite. While DARS will almost certainly revolutionize car audio, forward-thinking hams may well wonder whether this innovative technology will one day enhance the Amateur Radio service. This article, a follow-up to *QST*'s May 1994 "A Look at Digital Audio Broadcasting," highlights recent developments and looks to the future of digital radio.

From the first vibrator-powered tube radios of the 1930s, to today's microprocessor-controlled miniature marvels, car audio has remained fundamentally unchanged. We've come a long way since those early, temperamental vacuum-tube jobs, but—CD players, cassette tapes and thumping subwoofers aside—radio is still radio.

Drivers still ease the frustration of traffic jams by tuning to their favorite local stations—AM or FM. Whether beautiful music, top 40, album rock, country western, all sports, all talk or all shock, drivers choose whatever's on the local media menu.

More than 10,000 local stations across the country offer programming to listeners in a free market system of supply and demand, supported by advertisers paying to reach numerous listening audiences.

A number of national networks furnish a measure of programming consistency from coast to coast, but the stations them-

selves provide only local or regional coverage. Thanks to recent action by the FCC, however, this venerable era in broadcasting history will soon come to an end. Before the end of this century, "pay for play" satellite radio will compete with local radio stations for mobile listeners.

Powered by high-fidelity, commercial-free specialty programming—with consistent nationwide coverage—the drivers of America's 200 million cars and trucks will enjoy unprecedented listening opportunities.

DARS, the digital audio radio service, the FCC's official name for "high-fidelity satellite radio," has endured more than seven years of development, politics and financial maneuvering. In a little more than a year it will be as real as cable TV—and perhaps as influential.

## The Road to DARS

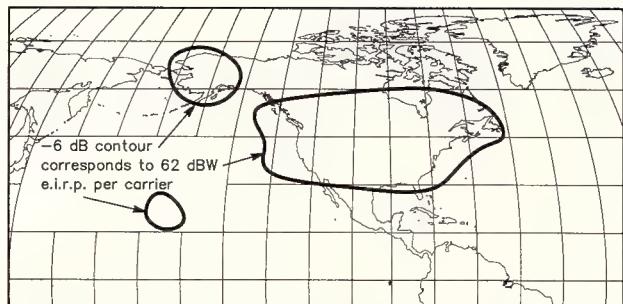
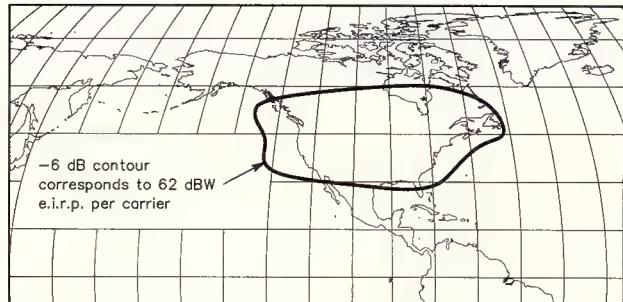
On April 2, 1997, the FCC gave the final go-ahead to two competing companies to

begin the process of taking DARS from a technically feasible proposition to an "in your dashboard" reality.

Over the past few years, as many as four companies sought to obtain one of the two DARS licenses to be awarded by the Commission. In the end—and after a harrowing 26-round, two-day spectrum auction in Washington, DC—CD Radio Inc and American Mobile Radio Corporation walked away as the winners.

CD Radio, based in Washington, DC (but moving to New York City), bid \$83.3 million for the first license. AMRC, of Reston, Virginia, a subsidiary of wireless giant American Mobile Satellite Corporation, paid \$89.9 million to capture the second and final license. Two other contenders, Digital Satellite Broadcasting Corporation and Primosphere Limited Partnership, did not make the final cut.

The same technological advances in microelectronics and digital transmission



Signal footprints for AMRC DARS satellites at 85°W (top) and 115°W. (figures are from AMRC's FCC application)

systems that made "mini dish" satellite TV systems possible have been available for DARS for several years. Implementation of satellite radio, however, has been slowed mostly by politics and industry lobbying.

The National Association of Broadcasters argued that satellite-delivered pay radio would siphon ad dollars from conventional local stations. Although space-based digital radio was inevitable, the NAB and other agents managed to delay introduction of the service until the turn of the century, when terrestrial digital radio begins its march to eventually replace traditional analog AM and FM broadcasts.

"Pay radio and local broadcast radio are totally compatible," says CD Radio founder and CEO David Margolese, one of the earliest DARS proponents. "What we're about to experience is very similar to the early days of cable TV. But today, the pervasiveness of cable systems is taken for granted, and local TV stations are still flourishing. In broadcasting, technology offers better performance and more variety, but there will always be a need for locally produced programming."

AMRC President Lon Levin agrees. "Just because you watch movies on pay TV doesn't mean that you abandon local stations for news, information, local on-air personalities and your favorite sitcoms. It will be the same with satellite radio. The two will coexist peacefully."

## System Overview

Each DARS provider will use a pair of high-power geosynchronous satellites to deliver programming to the continental US, and each has a 12.5-MHz slice of the 25-MHz DARS frequency allocation at 2.320–2.345 GHz.

Earth-based receivers (mobile and fixed) will be compact (the mobile antenna is the size of a silver dollar) and interoperable. That is, DARS decoders, whether stand-alone or built into your car radio or home stereo, must be able to receive programming from both providers.

Expect digital electronics and powerful software to make that happen, as CD Radio's system uses spread-spectrum CDMA modulation, while AMRC will likely transmit fewer channels via more conventional TDMA methods. Receivers "listen" to both satellites simultaneously (like hand-held GPS receivers), but seamlessly switch between individual satellites to lock in the best signal.

Programming subscription fees will range from \$5 to \$10 per month, and will tend to decrease as the number of users increases. Initially, DARS decoders (stand-alone and built in) will increase the cost of car audio by about \$150. To get things off the ground, both companies need to raise about \$500 million each to pay for satellite construction, launch fees and uplink/programming centers. Each company is well on its way financially.



If you have a cassette player in your car, this adapter will add satellite radio!

Domestically, previous users of spectrum at 2.3 GHz, mostly aeronautical telemetry licensees, have been accommodated elsewhere. With Canada and Mexico, which may experience interference problems to telemetry systems located near US borders, DARS providers must take reasonable steps to minimize or eliminate problems that may arise. Most countries have chosen to license DARS-type broadcasting in the 1452–1492 MHz band. At 2.3 GHz, the US DARS allocation is an exception shared only by India.

## DARS Technology

While there are potentially significant differences between the two DARS providers when it comes to program offerings, CD Radio and AMRC will use similar systems in the hardware department.

### Satellite Systems

Loral's FS-1300 satellite chassis will serve as the space platform for CD Radio's system. There are 24 FS-1300s in production (with 61 on order), making the three-axis stabilized Loral system mature and quite popular.

With a healthy 2-kW transmitter output power and high-gain antennas, CD Radio's satellites will put out nearly a megawatt of effective radiated power, more than enough to overcome the considerable satellite-to-Earth path loss and blanket the lower 48 states with a signal that can be received with the company's miniature mobile antennas.

Loral will build two orbiting DARS birds for CD Radio and a third ground-

based spare. Launch dates are set for August and November of 1999, and if all goes well, the FS-1300s will end up in orbital slots at 80° W and 110° W.

According to AMRC's FCC application, its satellite system is tentatively based on the Hughes HS-702 chassis, a three-axis stabilized bird that will cover the lower 48 (and Alaska and Hawaii) with an impressive megawatt-plus effective radiated power. With orbital slots of 85° W and 115° W, the two Hughes sats are scheduled to launch in late 1999 and early 2000.

Hughes is a major AMRC/AMSC partner, as is WorldSpace, a Washington, DC, technology company that is leading the push for worldwide satellite-based international broadcasting—a potential evolutionary step for today's shortwave broadcasters.

### Digital Compression

To pack so much programming into a relatively small 12.5-MHz bandwidth, both DARS providers use advanced digital transmission (and encryption) techniques to compress and protect their signals.

CD Radio uses AT&T/Lucent's perceptual audio coding system (PAC), which has also been chosen by USA Digital for future Earth-based digital radio systems. PAC takes the normal 1.44 Mbit/s CD-quality digital audio data stream and compresses it to a manageable 128 kbit/s (a 12:1 ratio).

AMRC's compression scheme is based on a dynamically allocated MPEG Audio Layer 3 system that compresses source audio from 12:1 (128 kbit/s for CD-quality sound) to 48:1 (16 kbit/s for "better than shortwave" quality sound). Using its multichannel TDMA modulation system, AMRC's control center can dynamically allocate channel resources and compression ratios to accommodate various program sources and quality levels.

### Receivers/Car Audio

The satellite technology used by DARS is notable—but the receiver and decoder systems that will end up in your car (or your mobile VHF/UHF rig?) will impress even the most jaded techno-junkies.

Both providers will offer add-ons that let drivers receive DARS programming through their existing car stereos, and both are working with manufacturers to provide built-in OEM AM/FM/cassette/DARS receivers. By the time DARS is operational

### Selected DARS Hardware and Performance Specifications

Specification	CD Radio	AMRC
Satellite Chassis	Loral FS-1300	Hughes HS-702 (tentative)
Type	3-axis stabilized	3-axis stabilized
Power Output	60 dBW EIRP	62 dBW EIRP
Mission Life	15 years	15 years
Orbital Position	80° and 110° W	85° and 110° W
Modulation Method	Synchronous CDMA	TDMA
Digital Compression	AT&T/Lucent PAC	MPEG Audio Layer 3
Uplink Freqs	7.025 – 7.075 GHz	7.025 – 7.075 GHz
Downlink Freqs	2320 – 2332.5 MHz	2332.5 – 2345 MHz

you'll be able to purchase receivers and adapters at local retailers.

And both providers will feature decoders that have unique digital IDs, much like today's satellite TV and pay-per-view systems.

The really fun stuff, however, involves the hardware and techniques used to provide users with easy, affordable access to the new satellite service.

CD Radio co-founder and technology guru Rob Briskman developed (and is patenting) many of the system's most elegant components, including the silver-dollar-size antenna that sticks on your car's rear window.

The small, thin, planar array, sometimes called a "patch antenna," contains a lot of high-tech goodies, including the receiving antenna itself, a solar battery charger, a battery, a 2.3 GHz-to-900 MHz "block downconverter," a 1-microwatt 900-MHz

transmitter and a 900-MHz loop antenna (located on the underside of the disc).

To eliminate the need for running signal and power leads to the mini antenna, the solar-charged system receives the digital data stream from the satellites, converts it (without demodulating the signals) to a frequency in the 900-MHz ISM band and retransmits the data to the receiver/decoder.

If your car has an in-dash DARS-compatible receiver, its built-in 900-MHz data module receives the flea-power signal from the patch antenna/converter, translates the digital music back to analog audio and passes it to your stereo's audio amplifier. You hear only the CD-quality audio. There are no wires to run here, there or anywhere.

Thanks to an unusual, elegant engineering solution, users without OEM DARS-compatible radios aren't left out in the cold. If you have a cassette player in your car radio, you're only seconds away from sat-

ellite radio.

Briskman's cassette adapter provides the magic link. Hiding inside a conventional-looking cassette housing is a 900-MHz receiver/decoder, a battery, a power generator and a high-fidelity "tape-head magnetic transmitter."

When it's time to listen to DARS, simply insert the CD Radio "cassette," push a channel-select button or two and away you go. The adapter receives and decodes the 900-MHz data stream from the patch antenna's low-power translator and passes it to the magnetic transducer that's now adjacent to your tape deck's own magnetic heads.

Your car radio thinks it's playing a tape and you hear high-fidelity DARS audio through your speakers. My favorite part of this amazing system is the micro-size electric generator (and battery charger) *inside the cassette adapter* that's powered by the tape deck's capstan drive (the rubber drive wheel that normally moves the tape past the magnetic heads)!

The internal battery is really only needed to provide "instant on" capability when the unit is first inserted, eliminating the 1-second delay before the internal generator gets up to speed. Again—no wires required!

Although it may never be manufactured because in-dash CD players are widely being replaced by in-trunk, multi-CD changers, Briskman developed a similar adapter for CD players that translates the 900-MHz signals from the patch antenna to a flashing (modulated) light beam that is compatible with the CD player's own laser decoder!

High-powered satellites aside, the innovations used by Briskman's wireless systems should garner respect from even the most revered ham radio technologists. This stuff, should hams adapt it to their own purposes, could be very interesting!

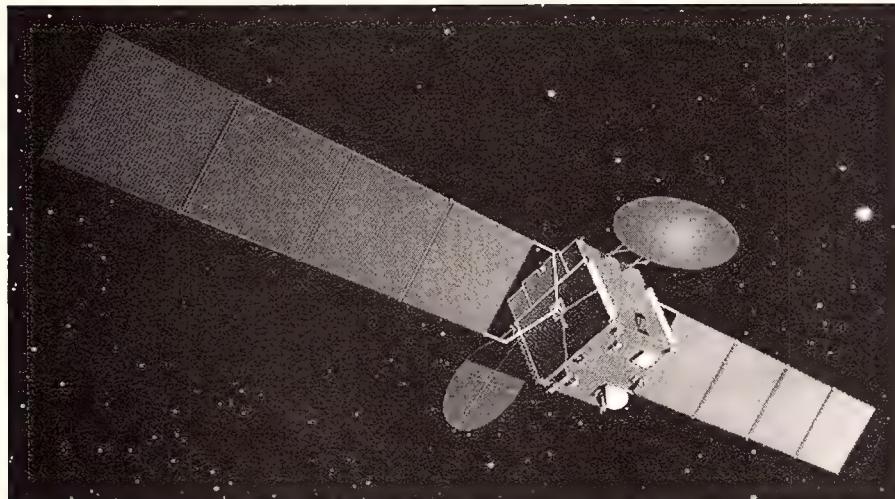
Margolese says CD Radio's complete system (cassette adapter, patch antenna and all batteries, manuals, program guides, etc) will retail for about \$150. Simply take your kit home, stick the antenna on the rear window of your car, plug the cassette adapter into your tape deck and dial CD Radio's convenient 800 telephone number (from your satellite cell phone, perhaps?).

You can set up your account over the phone, and when you provide your unit's digital ID number to the customer service rep, your satellite radio system will "authorize," and in a matter of minutes you'll be up and running.

Decisions haven't been finalized, but Briskman says the technology may be licensed to other manufacturers.

## Programming

Although program providers and channel lineups haven't yet been determined, AMRC's DARS system appears to be flexible enough to accommodate many program providers using multiple uplink methods. This should allow AMRC to pick and



An "artist's eye view" of CD Radio's Loral FS-1300 DARS satellite.

## What's on the Radio?

Initial music programming from CD Radio's Satellite Broadcast Center (these 30 CD-quality music channels will be in stereo; an additional 20 channels of talk, sports and news will be broadcast at reduced fidelity. Although the lineup of non-music providers hasn't been finalized, look for potentially interesting offerings such as the BBC or other powerhouse international broadcasters).

Channel	Programming	Channel	Programming
1	Symphonic	16	Latin Rhythms
2	Chamber Music	17	Reggae
3	Opera	18	Hip-Hop and Rap
4	Today's Country	19	Dance
5	Traditional Country	20	Urban Contemporary
6	Contemporary Jazz	21	Soft Rock
7	Classic Jazz	22	Singers and Songs
8	Blues	23	Beautiful Music
9	Big Band	24	Album Rock
10	Top of the Charts	25	Alternative Rock
11	Classic Rock	26	New Age
12	'50s Oldies	27	Broadway's Best
13	'60s Oldies	28	Gospel
14	Folk Rock	29	Children's Entertainment
15	Latin Ballads	30	World Beat

choose among existing program providers if the company decides not to produce its own content.

CD Radio, on the other hand, will definitely provide its own programming. The company is building a large uplink center in New York City—a large music programming operation under one roof.

"Think of it as 50 radio stations in one facility," says Margolese, who is quick to point out that CD Radio "is a media company that happens to use satellite technology to deliver its content. We're not a primarily satellite company." See the sidebar, "What's on the Radio?" for more information.

## Marketing

Margolese and Levin are both confident that the market for DARS will be large enough to allow both companies to prosper. According to a May 19, 1997, article in the *Washington Post*, satellite industry analysts are optimistic about the future of DARS and its financial viability.

One analyst estimates that CD Radio alone should have 7.5 million subscribers generating more than \$600 million in annual revenue by 2003. The convenience and relatively low cost to obtain DARS access

## DARS Resources on the Internet

Because the details of DARS and its implementation change almost daily, the internet is the best place to find the latest scoop. CD Radio's corporate home page at <http://www.cdradio.com> is a good place to start. There is also material available at the FCC homepage, <http://www.fcc.gov/>, and <http://www.skycell.com/>, the homepage of AMRC's parent company.

## Digital Radio's Future

There's no doubt that digital radio is here to stay, terrestrially and from space. The benefits in signal quality, programming variety, spectrum utilization and reduced circuit complexity (eventually) are too compelling to ignore.

In these early years, CD Radio and American Mobile Radio Corporation will compete and cooperate in making DARS a household name and household technology. While they work out the details, we drivers will reap the amazing benefits of satellite radio.

As a ham, it's interesting to wonder whether Amateur Radio will ever adapt satellite-based systems that take advantage of uniquely addressable receivers, miniature solar-powered translators, or satellite antenna/receivers that are small enough to fit on a hand-held radio!

As always, it's out with the old, in with the new. Now, if DARS had a Stevie Ray Vaughan "Texas Blues" channel ...

*The author, a ham since age 13, was a QST editor from 1988 through 1994. He now lives in Minnesota's lake country where he works as a technical writing/technical marketing consultant and freelance writer. He's a regular contributor to QST.*

**QST**

## NEW Products

### TJ ANTENNA COMPANY MOVES TO NEW MEXICO

◊ The BB3 Mobile HF Antenna, formerly manufactured by TJ Antenna Company of Hermiston, Oregon, is now being marketed and supported by Nott Ltd of Farmington, New Mexico, a manufacturer of antennas and hardware for the broadcasting industry.

Sales and technical inquiries should be directed to Nott Ltd, 4001 La Plata Hwy, Farmington, NM 87401; tel 505-327-5646, fax 505-325-1142, e-mail [102640.3503@compuserve.com](mailto:102640.3503@compuserve.com).

Tom Wilson, KA7W, the BB3's designer, has moved to Farmington and will be closely associated with Nott and the antenna's further development. The rugged mobile antenna continuously covers 1.8 to 30 MHz.

### COMPUTER CW INTERFACES FROM W1WEF

◊ Compatible with popular computer contest logging programs such as *CT*, *NA* and *N6TR LOG*, W1WEF CW interfaces are available for every solid state or tube-type transmitter/transceiver. The circuitry is neatly packaged inside the connector that plugs into your IBM-compatible computer. A built-in phono jack accepts a user-provided cable to key your rig.

is of particular benefit—especially to the owners of the 15 million new cars purchased in the US each year—and to the 5 million drivers who buy new car audio components each year.

There are potential problems, however. Satellite and launch failures have produced setbacks for several recent ventures. And if the two DARS providers end up subsidizing hardware (radio/adapter) manufacturers, as do "mini-dish" satellite TV providers, cash flow might be tight, especially at the outset.

Prices: Standard Model, \$23 (for solid-state rigs keyed via COM or LPT ports); Universal Model, \$35 (keys any solid-state or tube-type rig via an LPT port). For more information, contact Jack Schuster, W1WEF, 408 Thompson St, Glastonbury, CT 06033; tel 860-633-2756.

**QST**

## QEX:

### The ARRL Experimenter's Exchange

The November issue of *QEX* includes:

For microwave enthusiasts, Paul Wade, N1BWT, describes a single-board transverter for 5760 MHz. It's not a "no-tune" design, but pipe-cap filters and newly available MMICs provide good performance in a reasonable project.

For those of you deeply into data transmission modes, Ken Wickwire, KB1JY, goes over a software package for analyzing channel and station performance data from HAL CLOVER modems.

In line with our desire to provide simple projects along with more advanced material, Bill Latta, N4LH, shows us how to build very simple receivers using an inexpensive IC developed for AM broadcast receivers. He shows how to adapt these ICs for 80/75 m operation.

Zack Lau, W1VT, is back this month with the RF column. This time he provides the dope on a VHF local oscillator for KK7B's 23 cm no-tune transverter. As usual, his column is informative and thought provoking.

*QEX* is edited by Rudy Severns, N6LF,

(e-mail [rseverns@arrl.org](mailto:rseverns@arrl.org)) and is published monthly. Subscription rate (12 issues) for ARRL members is: US, \$15; Canada, Mexico and US by First Class mail, \$28; elsewhere by airmail, \$48 or by surface mail (4-8 week delivery), \$20. Nonmembers add \$12 to these rates.

Would you like to write for *QEX*? It pays \$50/printed page. Get more information and an *Author's Guide* at: <http://www.arrl.org/writing.html>. If you prefer "snail mail," send an SASE (6x9 inches, minimum) with 55¢ postage to Maty Weinberg, ARRL, 225 Main St, Newington, CT 06111-1494, and request an *Author's Guide*.



### I would like to get in touch with...

◊ I would like to hear from anyone who has modified an MFJ-989C antenna tuner by adding vernier control knobs to the capacitors and a mechanical gear-type turns counter in place of the rubber band control for the roller inductor. Please contact Harry J. Irwin, KF0QB, 292 Upper Valley, Spearfish, SD 57783; or e-mail [HIrwin@WEBTV.net](mailto:HIrwin@WEBTV.net).

◊ I am looking for other hams who are Shriners and/or Shrine-ham radio clubs. Contact Noble Charles E. Martin, AB4Y, PO Box 640, Keyport, NJ 07735; e-mail [cemab4y@usa.net](mailto:cemab4y@usa.net).

# Radio Coaches

Team up with the ARRL for an exciting public service challenge!

Over the years, in the pages of *QST*, countless letters and articles have been written about Elmers, those patient, inspired individuals who thoroughly enjoyed bringing newcomers into the world of Amateur Radio. Maybe one of those newcomers was you. If so, then you know how discovering Amateur Radio at a young age made a difference in your life. Maybe it taught you how to build relationships with adults, gave you an edge in learning math and geography, or perhaps even put you on the path to a rewarding career.

Now there's a way for you and your fellow club members to become part of a national program focused on bettering the lives of young people everywhere. You can do it through Amateur Radio in your community and we'll provide the game plan!

## Presidential Summit Kicks-Off National Campaign

Earlier this year in Philadelphia, President Clinton and former President Bush, along with other national political figures and people from communities across the country, gathered for the "President's Summit for America's Future." The highly publicized event was organized to kick off "America's Promise, the Alliance for Youth," a national, multi-year campaign to better the lives of the nation's young people and put them on paths for brighter, more productive futures.

This praiseworthy objective stimulated the interest of many Amateur Radio operators who understood our spirit of volunteerism and commitment to youth. That's why the ARRL Board of Directors authorized the creation of the "Radio Coaches" program to encourage more membership involvement in youth activities.

If your club chooses to participate, you'll be in good company. Until the year 2000, individuals, educational organizations, and businesses throughout the United States are making commitments to help ensure that young people have access to five critical resources: (1) ongoing relationship with caring adults; (2) safe places and structured activities during nonschool hours for learning and growing; (3) a healthy start through proper medical care; (4) marketable skills through effective education; and (5) opportunities to serve their local communities.

The types of commitments being

pledged range from a bank that will give jobs to 500 local inner-city youths and provide volunteers for their schools, to an eighth-grade class who will tutor local elementary school students to prepare them for their transition to middle school. To fulfill our commitment, Radio Coaches focuses on the energy and ingenuity of our Affiliated and Special Service Clubs.

## Radio Coaches—Amateur Radio's Commitment to Youth

How does it work? From day one, we supply information to help your Affiliated or Special Service Club form a "coaching team." Your team will build a relationship with a local school, community organization or other institution from which you will recruit your "athletes." You will coach young people in your community on the basic elements of electronics and the magic of radio communication through exposure to Amateur Radio. In addition to students gaining experience with Amateur Radio, you may arrange field trips to technology museums, radio conventions and hamfests. Or you may choose to introduce students to local businesses such as radio/TV stations, airports, paging services, cellular telephone providers, police and radio dispatchers and others who use radio technology. Your job as a coach will be to make every member of your team more aware of how these experiences can lead to career opportunities in the emerging world of telecommunications.

The ARRL will support this effort by providing clubs with flyers to help recruit youngsters, curriculum materials and other informational resources necessary to make this program work for everyone. We'll also provide youth packages with handouts to accompany the curriculum materials. We'll supply the strategy and you'll supply the energy and imagination.

Why did we settle on the concepts of "coaches" and "teams"? We want to reinforce the idea that Amateur Radio is a "sport for the brain." Ham radio provides not only a lifetime of enjoyment, but also, potentially, a lifetime career. Introducing a gentle note of competition will get your "athletes" excited about learning, and get them thinking about pursuing a vocational interest in technology. In this game everyone wins!

## Going for the Goal

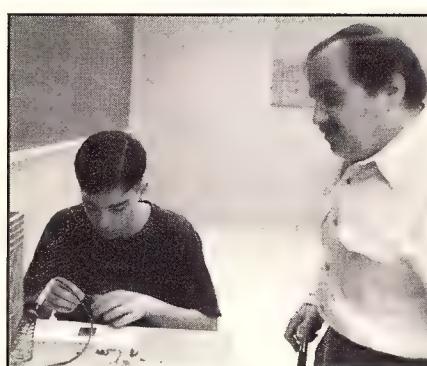
Together, our mission will be to give young people an ongoing relationship with a caring adult and a marketable skill through effective education. Amateur Radio will be our chief tool.

The ARRL's long-term goal will be to recruit as many as 100 clubs into the Radio Coaches program. Each club would make the commitment to help at least 20 youngsters per school until the year 2000. With this plan, the Amateur Radio community could influence approximately 4000 students. The ARRL will help support you during the time of your commitment. As the year 2000 draws closer, we'll be compiling a casebook on your most successful programs from around the country.

But it will only work if you put on your coaching hat. Enthusiastic Amateur Radio volunteers have the tools, the knowledge and the commitment to public service to make a valuable contribution to young people in our communities. We hope you'll start talking with your fellow hams and club members right away. Begin considering ways in which you can make a valuable contribution to this program and today's youth.

## Find Out More!

For more information on how you can get involved in our Radio Coaches program, contact "Radio Coaches" c/o Field Services Department, ARRL, 225 Main Street, Newington CT, 06111; e-mail [coaches@arrl.org](mailto:coaches@arrl.org).



Rob, N2JIX, ARRL Official Observer and Observer Coordinator, helps Ian, AA2XR, with some soldering techniques at the Long Island Mobile Amateur Radio Club "junior operators" meeting.



# NEW HAM COMPANION

## The Doctor is IN

**Q** Don Cook, KJ4PO, asks, "I recently purchased a used headset and microphone at a flea market. There was no documentation. What is the best way to 'characterize' the components? In other words, how do I go about determining the impedance of the earphones and microphone, and what the microphone needs to function properly?"

**A** The best way to characterize headphones is to measure their impedance at several frequency points, but most hams don't own the necessary equipment. You can make a crude measurement with a simple voltmeter. Place a potentiometer in series with the headphones and feed an audio signal to them (preferably a 1-kHz continuous tone). With the voltmeter on the ac setting, measure the voltage across the headphone and across the potentiometer. Adjust the resistance of the potentiometer until the voltages are the same. Disconnect the potentiometer and measure its resistance. The result will be reasonably close to the impedance of the headphones—at least close enough for amateur work.

The microphone can be characterized by running it into a very high impedance audio amplifier, and then placing different loads across the microphone until the audio characteristics are optimized. The maximum volume may not correspond to the best audio characteristics. It is quite common for people to just "approximately" load the microphone and use an external equalizer. This allows more flexibility.

**Q** I am trying to use my new tiny mobile radio in my shack, but it is so small and light that I keep pulling it off the table when I pick up the mike. I don't want to screw a second bracket into the table, and the bracket that came with the radio is installed in my car. Any suggestions?

**A** For years hams have had similar problems with CW paddles moving across operating tables—the new generation of tiny VHF/UHF rigs have now joined this "mobile" group. Standard cures have included old-fashioned black friction tape and pieces of indoor/outdoor carpeting. Since this new variation on the classic problem is due to new technology, perhaps you might try a new-technology cure. Place a mouse pad under the rig! They are often available for a dollar or two at flea markets. If the rig still moves, cut the mouse pad in two and join the two smooth sides with a few dabs of glue. Now you have the rough bottom side on both top and bottom, which should hold almost any rig in place!

**Q** Josh Gould, KC8EQA, asks, "I own a VHF transceiver that is capable of MARS (Military Affiliate Radio Sys-

tem) reception. What are some of the popular VHF MARS frequencies?"

**A** The most active VHF MARS frequencies are:

Army—143.990 MHz

Navy/Marine Corps—148.375 and 148.975 MHz

Air Force—143.450 MHz

**Q** One of the new software packages I recently downloaded uses my SoundBlaster compatible audio card. The installation instructions suggest connecting both channels to the monaural input from my receiver. What sort of cable can I use?

**A** You can take a piece of shielded wire and connect the inner conductor to the tip on a standard monaural 1/8-inch audio plug on one end, and the other end of the center conductor to both the tip and ring of a stereo plug on the other end. The shield of the cable goes to the outside barrel on both ends. If wiring 1/8-inch plugs is not your favorite occupation, you can buy a pair of stereo plugs with a convenient length of wire between them—say, 4 feet. Then a converter plug, such as Radio Shack 274-374, will convert one end to monaural by shorting the tip and ring contact together. This converter plug goes to the audio output jack of your receiver. The other, unconverted end of the cable goes to the SoundBlaster input jack.

**Q** Most of the books describing the ways to set up a ham shack suggest running a ground bus behind the equipment, and tying all of the ground connections to this bus. I found ground bus bars in an advertisement, and they cost over \$5 a foot! Isn't there a cheaper way?

**A** Of course! Just use 1-inch wide (or wider), perforated chimney strapping. The conductivity is not as good as silver-plated copper, but for short runs (under 10 feet) you should not see any difference. Use a no. 8 or no. 10 screw, two flat washers and a lock washer to make a set of tie posts every six inches or so. Large-headed wood screws spaced 12 inches or so will hold the ground bus in place. The total cost is probably under \$6 for 10 feet.

**Q** Paul Walcott, WD8H, asks, "What is the legal status of cross-band contacts? Specifically, would it be legal for a Technician licensee to transmit on 2 meters and listen for a response from a General (or higher) licensee who is transmitting on 160 meters? In both cases, the individuals are transmitting within the limits of their licenses."

**A** Cross-band QSOs are completely legal. In fact, they are common on VHF, especially through satellites. Also, some VHF and UHF repeaters have FM cross-band links to the FM portion of 10 meters. These links allow Novices and Technicians to work DX when 10 meters is open.

The type of operation you describe, while legal, isn't common for one reason—every QSO must be scheduled in advance. If a Technician randomly calls "CQ" on 2 meters expecting an answer on HF, he or she will be waiting a long time!

**Q** I'm about to invest in a 56 Kbps modem for my home PC. I use the Internet quite a bit to swap ham software, exchange e-mail and stay on top of the latest developments in Amateur Radio. However, I'm tired of slogging through the Web at 28.8 Kbps. What is your take on the new 56 Kbps units?

**A** The new 56 Kbps modems are wonderful devices, but your purchase decision is going to be a little complicated!

The problem is that there are two high-speed telephone-modem technologies doing battle for domination of the computer market. US Robotics (USR) was the first entry in this race when it began shipping its X2 modems early this year. But right on its heels came Rockwell/Lucent's K56flex design.

Here's the catch: The two products offered by USR and

Rockwell are *mutually incompatible*. Your new 56 Kbps modem will only work if you deal with an Internet service provider (ISP) who is using the same technology as you!

An ad hoc committee of the Telecommunications Industry Association (TIA) was formed to develop a North American 56K standard. This will then be submitted to the International Telecommunications Union (ITU). The committee will review the technologies, and it will either pick one of the competing versions, or something very close to it. While we wait for a decision, the war still rages between USR and Rockwell/Lucent.

If you're worried about buying a 56K modem with the "losing" technology, don't. Both sides have already announced that they will offer free upgrades once the standard is chosen. Until that happens, the best advice is to buy the same technology that your primary ISP is using.

But if you buy a 56K modem, will you really enjoy data transfers at 56 Kbps? Not necessarily. You certainly will *not* be uploading at 56 Kbps. The maximum upload speed remains set at 33.6 Kbps. (Because of this difference between upload and download speeds, these technologies are called *asymmetric*.)

Here are the requirements for you to be able to get the greatest benefit from a 56 Kbps modem:

- A good local connection to your telco central office switch. In other words, a low-noise telephone line.
- An account with an ISP that offers 56 Kbps.
- A match between the technology that you use and the type offered by the ISP.

Even if you have the right equipment and matching technology on each side of the connection, the data rates will vary considerably. Is it realistic to expect you will get 56 Kbps each time you download? The answer depends on your connection to your provider. If your connection is superb and virtually noise free, you may indeed approach 56 Kbps. But if you are not presently getting 28.8 Kbps out of your 28.8 modem, don't expect to get 56 Kbps!

By the way, there is a 30-year-old federal regulation that caps downstream data transmission speeds over regular phone lines at 53 Kbps because of potential interference with adjacent lines' traffic. Manufacturers are trying to have the rule waived. This will require approval from the carriers that the law was supposed to protect.

**Q** Help! My junk box is out of control! What did the old-timers do with small collections of resistors, screws, diodes and dozens of other parts?

**A** One favorite solution was to go out and find a baby—or more accurately a source of baby food jars. There are one or two popular sizes for baby food, and one or two more for junior food. The low cost of these jars (today saved from the fate of recycling) makes it practical to use a separate jar for each nut size, screw size, washer size, diode type and whatever else is overflowing from that cardboard box on your work bench.

**Q** Where can I find a simple explanation of frequency hopping as it applies to spread spectrum communication?

**A** The answer is as near as the *ARRL Handbook*. Here is a small sample to whet your appetite ...

"Two obstacles to sending greater amounts of information are bandwidth and frequency congestion. *Spread spectrum* implies the use of a wide bandwidth, and that's correct, in a way. It doesn't mean that a station transmits a single 'wide' signal, but that it slices a whole band into a belt of frequencies that it can use virtually simultaneously. Although a signal is actually present only on one frequency at a time, the effect is that of having a whole band to operate within."

"The bandwidth of an amateur emission is restricted by FCC specifications. A signal may only take up a given amount of space. If so much information is to be carried that the transmitted signal becomes too broad, it reduces the number of stations that can use a band. If several stations wish to transmit simultaneously on one

part of a band, one of two things happens: They interfere with each other or they must take turns, thereby reducing the total amount of information that can go through each RF circuit over a period of time.

"On the other hand, what if a station could transmit information over a wide range of radio frequencies, but use only one at a time? Assuming the transmitter and receiver were synchronized, a signal could jump from one frequency to another in a matter of milliseconds. Each 'hop' would last a mere blink of an eye (or actually, much less time than it takes a human to blink an eye). Now several stations could occupy the same bandwidth at the same time, as long as their respective hops didn't coincide too often. With the proper electronic processing (computer hardware and/or software), each pair of stations could have the equivalent of a whole band to themselves. And several pairs of stations could see almost the same 'free space' on a band because the only time they would be aware of each other would be if a random hop happened to coincide.

"Mathematical formulas can be used to minimize the odds of frequent 'collisions' and a list of specific 'plug-in' frequency schedules could be used to allow outsiders to monitor a frequency-hopping QSO or to locate and respond to a CQ. (In fact, the FCC has stated that hams may use only a narrow range of spread-spectrum schemes. This makes it possible to monitor such operations. It also precludes hams from using protocols that might effectively amount to data encryption.)"

## **Q** What is coherent CW?

**A** To the untrained ear, coherent CW sounds identical to "normal" CW—except that the characters are sent in a very precise manner. The Morse is sent and received by computer and, because of the synchronized nature of the mode, can be "understood" in less-than-optimal conditions. As with other digital modes, the text appears on the computer monitor as it is decoded.

The standard speed for coherent CW adopted by Ray Petit, W7GHM, when he designed the system was 12 WPM. Ray specified the dot length as 100 ms, an element space at 100 ms, a dash and character space at 300 ms and all other spaces as multiples of 100 ms. This timing is still in use today.

Coherent CW depends entirely on accurate timing based on the element length. Imagine two square waves, both identical in timing but derived from separate oscillators and having the mark length equal to the space length and both these equal to 100 milliseconds. If started together, they will stay in step indefinitely if the clocks generating them are perfectly stable. The original hardware coherent CW system was based on this principle and highly stable oscillators and transceivers were required. This is the main reason why coherent CW never generated much enthusiasm in the ham community when it was first introduced.

Thanks to the evolution of personal computers and software, coherent CW is now possible with most modern commercial transceivers. The rigs are reasonably stable and software can be used to generate precisely timed code (and compensate for drift as well).

Despite the fact that it's easier than ever before to run coherent CW, there is very little activity. The few coherent operators on the air are usually found about 20 kHz up from the bottom ends of the bands. (Watch for stations calling "CQ CCW.") Coherent CW has been superseded by more advanced digital communication schemes such as CLOVER and PACTOR II. Still, coherent CW may be the only synchronized digital mode that is decodable by both the human brain and computer!

---

**Do you have a question or a problem? Ask the doctor! Send your questions (no telephone calls, please) to: "The Doctor," ARRL, 225 Main St, Newington, CT 06111.**



# On the Road: The Joys of HF Mobile

**Y**ou've just purchased the finest machine the automobile industry has to offer. You're still drooling over the purring engine, the gleaming chrome, the crushed-leather interior. The crisp new-car fragrance is as fresh as the paper floor mats.

You're standing at the gates of automotive Nirvana, but the scenario isn't complete. Before you cruise the streets in your fabulous new monument to mechanical engineering wizardry, there's one thing you *must* do ...

Slap a big, ugly antenna on it!

Hams will shudder with envy as you ooze down the boulevard with your HF monstrosity whipping in the breeze. The nonham heathens will just shudder, but what do they know? They can't appreciate the pleasures of tickling the ether from the front seat of an automobile. "Paradise by the dashboard light" has a somewhat different meaning for them.

But HF mobiles aren't quite the rare animals they used to be. We're hearing more HF-active hams on wheels these days because...

- Antenna restrictions and RF interference problems are making it increasingly difficult to operate at home.

- Two-income households are squeezed for time. After work, dinner, taking the kids to soccer games and so on, there's nothing left for Amateur Radio.

- Compact transceivers such as the ICOM IC-706, Kenwood TS-50, Yaesu FT-900, Ten-Tec Scout and Alinco DX-70 make HF mobile operating easy and affordable.

My own story is typical. I have a 3-year-old daughter who is the center of my personal universe. When it comes to choosing between an afternoon at the park with her and an afternoon in front of the radio, my daughter wins in a heartbeat. Life is short and kids are only kids for a few precious years, so *nothing* gets between my daughter and me—not even ham radio.

The solution is to work Amateur Radio into those little chunks of time that remain unreserved. I have two ideal time slots each weekday: my 30-minute commutes to and from the office. With an IC-706 transceiver installed in my Saturn SL-2, I work 20-meter SSB or 2-meter FM. Or listen to shortwave broadcasts. Or listen to airliners on 125.800 MHz as they approach Bradley International Airport. Have I left anything out?

Take it from me—mobile operating is *fun!* I'm on the air and enjoying our hobby more than I have been in years. My wife is happy with the disappearance of my backyard antennas (although a few still haunt the attic) and my daughter doesn't have to compete with a silicon-based lifeform for her dad's attentions.

## HF in a Saturn?

Ask any Saturn owner and he'll tell you that the exterior of this fine automobile is mostly polymer plastic. Only the hood, roof and trunk are metallic. Considering the fact that an HF mobile antenna needs a decent ground plane to function, where are you going to find such a thing in a Saturn?

A volt-ohm meter supplied the answer. I connected one meter lead to the negative terminal of the Saturn's battery by way of a l-o-n-g piece of wire. I used the remaining lead as a probe, touching various metal surfaces and watching the LCD readout. When

Can't  
enjoy  
ham  
radio  
from  
home?  
Try it  
from  
your  
car  
instead!



My 1993 Saturn SL-2 adorned with a 20-meter Ham Stick antenna on a magnetic mount (center of trunk lid). The quarter-wavelength 2-meter whip is visible on the left-hand edge of the lid.

my probe met the underside of the Saturn's trunk lid, bingo! The meter displayed nearly zero  $\Omega$ , meaning that the lid had "continuity" with the car's interior frame and electrical ground system. I had finally struck gold—a "golden" ground plane, at least.

My antenna choice was the monoband Ham Stick because I was primarily interested in 20 meters. (There are plenty of alternative antenna choices. See the sidebar "Which Antenna?") I didn't want to install the Ham Stick permanently. Instead, I wanted an installation that I could remove quickly if necessary. The obvious solution was a magnetic mount planted squarely in the center of the trunk lid. Most "mag mounts" for HF antennas are large contraptions with three or four disc magnets. They're big and obnoxious, but they do the job. My IC-706 has 2-meter capability, so I also installed a tiny 2-meter whip antenna along the edge of the trunk lid. It's designed for easy removal, too. Just loosen the allen nuts and it's gone.

I nestled the main body of the IC-706 in the trunk, holding it in place with Velcro straps, and routed the external speaker leads into the passenger compartment. With the auxiliary speaker safely perched atop the back dash, the next task was getting power to the radio. Or, in my case, getting the radio to the power!

Inside the engine compartment I located the thick rubber grommet that passes the wiring harness through the firewall and into my Saturn. With a large screwdriver I pried away the edge of the grommet and slipped in some stiff, insulated wire. I pushed the wire slowly until it finally appeared below the interior dashboard. I secured the ends of the dc power leads to the wire, then pulled gently from the engine side until the leads popped into view. I added fuses to the negative *and* positive leads before I attached them to the battery terminals.

You can't operate a radio if it's in the trunk, which is why I purchased a rig with a detachable front panel. I simply snaked the data cable from my IC-706 to the transmission hump between the front seats. With a little strip of Velcro tape (isn't that stuff great?) I was able to install the front panel directly behind the shift lever. I screwed a 20-meter Ham Stick into the mag mount and was ready to hit the highway.

### Tuning the Antenna

I started the Saturn and deftly thumbed my transceiver's **POWER** button. I felt like Captain Picard on the bridge of the starship *Enterprise*. "Warp 9, Mister Data. Engage!"

The 706 came to life with a roar of static. I set the rig to 14.250 MHz, picked up the microphone and uttered my call sign. If I were really on the *Enterprise*, I would have heard Scottie screaming, "The SWR is too high, Captain! She won't take much more!" Too high is an understatement. I stared at the radio's LCD display in dumbfounded amazement—my SWR was *infinite*.

More tests showed that my SWR was infinite from one end of the band to the other. There was better news on 2 meters where my

little whip was presenting a 1.3 to 1 SWR at 146 MHz.

"Okay," I muttered. "I can deal with this." In truth, I had already guessed the problem. You see, contrary to accepted mythology, mag mounts *do not* couple to ground through the magnets. I had naively hoped that the ground connection established through the coax and the transceiver would be sufficient for the antenna. Wrong!

So, how would I go about grounding the mag mount without defeating its portable purpose? The solution was to run a short length of copper braid from the underside of the trunk lid (where it was attached with a machine screw) to an impromptu ground attachment (equipped with a wing nut) on the mag mount. Now my Ham Stick was grounded right at the trunk and I could still remove the mount easily. All I had to do was loosen the wing nut and pull.

The improvement was dramatic! The Ham Stick was now resonant with a 1:1 SWR at about 14.100 MHz. At the band edges the SWR climbed to about 2:1. I trimmed the whip a little and that brought the resonant point up to 14.200 MHz, which is exactly where I wanted it for phone operating.

### "Wichkey Barbo Bait—Mobile!"

I finished my mobile installation on the weekend of the IARU HF World Championship contest. Twenty meters was alive with DX. It was the perfect time to test my new station!

As I hauled my toolcase back into the house, I noticed that my wife and daughter were about to leave for the garden store. "Don't bother!" I barked like an overstimulated Chihuahua. "Lauren and I will go. You stay home and take it easy."

My wife's eyes narrowed. "You hate the garden store. Their greenhouse gives you allergy headaches."

"But it's a perfect day to try my new sinus medication, don't you think?"

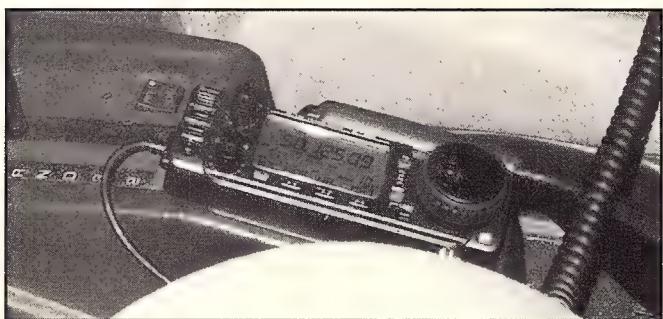
She glanced past my shoulder at the Saturn sitting in the driveway. "Oh, you put that *thing* on your car. I suppose you need to test it."

"Well, that would be nice, too."

Ten minutes later my daughter and I were zipping down Interstate 91. Twenty meters was wide open and a German station was



The dc power cable from my IC-706 is connected directly to the Saturn's battery. Note that there are fuses in both leads.



With a little adhesive Velcro I was able to attach the 706's remote front panel right beside the driver's seat.

### Which Antenna?

Check the advertising pages of *QST* and you'll find a bewildering variety of HF mobile antennas. There are pros and cons to each:

- The slender monoband Ham Sticks (and similar models) offer low wind profiles and more aesthetically pleasing appearances, but you must replace one antenna with another to change bands. They're lightweight, but I wouldn't recommend trying a trunk-lip mount. Select a magnetic or bumper mount instead.

- "Resonator" antennas have been popular for years. Again, however, you must swap one resonator for another to change bands. The exception is the "multiple resonator adapter" that allows you to feed three resonators from a single coaxial cable. The result looks like an electric porcupine. Regardless of which approach you choose, attach this antenna to your car with something sturdy (like a bumper mount).

- Multiband mobile antennas such as the Outbacker, the Multi-Band Spider, the Palomar AN-7, the Comet CA-HV and others attempt wide coverage (80-10 meters and sometimes beyond) while still maintaining a relatively low profile. Except for the Comet and Spider (which use multiple coils), you must change taps to change bands.

- On the high-profile side, check out the Broadbander BB3 by T.J. Antenna, the QMS package by SGC, the Texas Bugcatcher by GLA Systems or the Model 1500 from High Sierra. Most of these HF mobile antennas systems employ some type of remote tuning. They're *big* and need rugged mounting schemes to match. A durable bumper mount is the minimum requirement.

rounding up contest contacts on 14.190 MHz. When he said, "QRZ?" I threw my call sign into the fray.

"The Whisky Bravo Eight mobile, come now," he replied. "Yes!" I shouted, pumping my fist in the air. My daughter giggled from her car seat and spoke into an imaginary microphone. "Wichkey barbo bait—mobile!"

I completed the contact and proceeded to make about a dozen more before we reached our destination. In the short space of 15 minutes I worked stations in Spain, Switzerland, Hungary and Romania, just to name a few. As I strolled through the hot, humid, stinking, pollen-infested, godforsaken greenhouse I was beaming with triumph.

### My Commuting Companion

In the days and weeks that followed, my mobile transceiver became my commuting companion. Twenty meters is fairly quiet when I'm on my way to work at about 1130 UTC, but I often hear Asian stations popping through around 14.200 MHz. By the time I reach the office, propagation conditions have shifted and the Asians have faded into the noise. (As of this writing I haven't bagged a Japanese contact from the car, but I'm working on it!) If the pickings are slim on 20, I jump to 2 meters and check out the local repeaters. If the repeaters are silent, I head back to HF for the shortwave broadcasters. English-language programming from Radio Sweden comes booming into the northeast in the early morning!

During the afternoon drive homeward, 20 meters is usually hopping. I'll never forget the time I busted a pileup and worked Market Reef while waiting at the Burger King drive-up window. When the OJØ called me, I almost replied, "One Whopper with cheese. No mustard or pickles, please."

And if you tend to commute at roughly the same times each day, you often run into the same people. I frequently hear Vag, GIØEJU, on the band in the late afternoon from Northern Ireland. You can't imagine how surrealistic it is to be barreling down an Interstate highway and chatting with Vag—3000 miles away—at

the same time.

This isn't to say that all of my mobile enjoyment is DX oriented. Domestic contacts are equally rewarding. During many commutes I simply listen to the conversations. One day I overheard a ham describe a harrowing flight across central Africa in an ancient twin-engine Beechcraft. They were only an hour into their flight when an engine burst into flames. The pilot shut it down, but they had nowhere to land—and hundreds of miles left to go on the remaining engine! (They completed their nail-biting journey safely.)

And there are heartfelt moments, too. Early one morning I heard a fellow calling CQ on the high end of 20 meters. I answered, even though I was only minutes from the office. As we talked I mentioned that my 13th wedding anniversary was coming up that weekend. He replied that he and his wife had been married for 54 years, but that she had gone into a nursing home a few days ago. You could *hear* the loneliness and despair in his voice. Changing the subject, I asked what he was doing later that day. "Nothing," he replied. "Without her in the house it's unbelievably empty. Thank goodness for Amateur Radio."

### Tips and Techniques

Just because I can string words together, that doesn't mean that I'm an HF mobile guru. Far from it! I have managed, however, to accumulate some small nuggets of wisdom that you might be able to put to good use.

- **An effective noise blanker is worth 10 times its weight in gold.** When you're shopping for HF mobile transceivers, check their noise blankers *carefully*. An effective noise blanker makes all the difference between a fun mobile experience and one that will put you in a mental hospital. A good blanker will virtually eliminate ignition noise; a lousy unit will do almost nothing at all. *QST* product reviews usually include discussions of noise blanker effectiveness.

Blankers will not eliminate all bothersome signals. If you find that your car is creating unacceptable noise, there are a number of techniques that may squelch it. Pick up a copy of the ARRL book, *Radio Frequency Interference—How to Find It and Fix It*. Contact the ARRL Publication Sales department toll free at 888-277-5289, or see the full ARRL publications line on the Web at <http://www.arrl.org/catalog>. While you're at it, grab a copy of *Your HF Mobile Companion*.

- **Turn off the receive preamp.** If you own a modern HF transceiver, chances are it has a front-panel button that allows you to disable the receive preamp. Use it! Turning off the preamp will do wonders for your noise levels. You won't hear the weaker stations, but you're not likely to work them anyway (see next page). With your preamp off you'll enjoy quieter conditions and you'll still hear plenty of signals when propagation is good.

- **Keep the capabilities of your mobile station in perspec-**



My heavy duty mag mount—before "modification."

## QRV CW/m

The most fun I've had in my nearly 40 years as a ham has been operating mobile CW. My mobile HF rig tended to gather dust until I discovered that driving and CW were not incompatible and that I could copy CW much better than I'd first thought. In recent years, I've run into more and more CW/m ops and have enjoyed several mobile-to-mobile CW contacts. Still, I encounter many stations who have never worked a CW mobile station before, and they're always amazed at what we CW/m ops take for granted.

How do you do it? Well, the first requirement is that you have to be fairly proficient in CW and able to "copy in your head." It's unlikely you'll be able to jot down CW and drive at the same time—at least not without potentially disastrous consequences. You don't have to be fast, but it helps. Mobile CW also has taught me to be concise. For starters, I send everything just once (the other op will ask for a "fill" if he doesn't copy), use lots of abbreviations and little punctuation. Also, I'll often simply use BK to turn it over instead of sending both call signs.

For me, CW helps "shorten" my commute to and from HQ (approximately 45 minutes), although I shut down the rig if heavy traffic or bad weather intervene. Safety always comes first! My modest setup (100 W to a simple mobile "stick" on the roof) can work around the world if conditions are right. The /m designator sometimes attracts attention in a pileup, too. On 40 meters, my favorite band, I regularly work into Europe in the evening. Other times, I enjoy a lengthy rag chew with friends or new acquaintances. I've even operated contests from my car! (see "Sweepstakes Shack on Wheels," *QST*, Nov 1993).

Today's cars do not lend themselves to ham radio installations, so you'll need to figure out how to put the transceiver's controls and (especially) your key or keyer paddle (preferred) in a comfortable and safe location. Yes, it's possible to strap a key or paddle on your thigh, but you must remember to take it off before you exit the vehicle. My paddle sits atop my transceiver because I have room in my car. But I've also operated from other vehicles with the paddle in the (unoccupied) passenger seat.

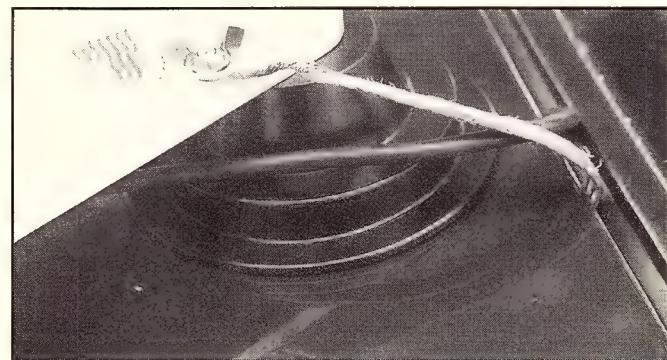
Other Headquarters staff have toyed with CW mobile, too. Ed Hare, W1RFI, has been active under his old call, KA1CV, on the CW county-hunter's net on 14.056 MHz. Ed's CW mobile motto is, "45 WPM at 55 MPH," but he confesses that he is lying about one of these "parameters!"

Operating CW on the fly has added another dimension to my hamming activity, and it's loads of fun! For more tips, see "A-1: It's Not Just for Homeburgers," *QST*, Sep 1991).—Rick Lindquist, N1RL

**tive.** No, you will not be the loudest signal on the band. No, you will not be able to work everyone you can hear. Yes, your signal, and the signals you're listening to, will fade in and out as you zip beneath overpasses, slink through deep valleys and so on. In other words, don't expect the same performance that your buddy gets from his tribander atop an 80-foot tower. Since you don't have an ideal station at your disposal, you have to play the game a little differently. For example, keep your transmissions short to make sure the other person is still copying you. When you're trying to crack a pileup, hesitate a couple of seconds before tossing out your call sign. Let the big guns butt their heads together first. And always tag your call sign with the word "mobile"—many DX stations will make special efforts to work mobiles if they know they're out there.

• **Install a decent auxiliary speaker.** Unless your car is exceptionally quiet, you're going to have road noise competing with the audio from your transceiver. Most built-in speakers are small; they're not designed for high-decibel workouts. Invest in the best external speaker you can afford. Good audio fidelity at high volume levels is the top priority.

• **Be kind to your battery.** It's incredibly easy to deplete your car battery. A typical 100-W transceiver draws about 25 A in transmit. Even when receiving they'll drain as much as an amp or



Grounding the mag mount to the trunk lid with a piece of copper braid made it possible finally to resonate the antenna. I used a wing nut for quick, easy removal.

more. Operate with your engine running so that the alternator can keep the battery fully charged. If you must operate with the engine off, make it brief.

And don't forget to turn off your radio when you leave the car! If you install your rig by connecting it directly to the car battery, the radio will remain on when your ignition is off. Because my IC-706 has 2-meter capability, I often find myself chewing the fat on local repeaters. This is a little dangerous because I tend to use the '706's squelch function to preserve my sanity. Unless the radio is blaring when I pull into the driveway, my impulse is to simply switch off the Saturn and walk away. The result would probably be strange voices outside in the middle of the night and a dead battery the next morning!

Fortunately, there is a nifty little device that you can install at your battery that will automatically cut power to your transceiver if you forget. It's the BS-25 automatic battery saver from Oak Bay Technologies. Contact Oak Bay at PO Box 65494, Port Ludlow, WA 98365; tel 360-437-0718; <http://members.aol.com/oakbaytec>.

• **When you install your transceiver, make sure it's secured.** This is particularly true for transceivers in passenger compartments. A radio sitting on the floor or passenger seat is going to become a heavy flying object in an accident. Crunching your car is bad enough; the last thing you want is to be injured by your own radio.

• **Safety, always.** If you find yourself concentrating on the rig more than the road, *turn your radio off*. Do you really want "CQ, CQ ..." to be the last words you ever hear? Speaking of radios, don't forget that there are others who love your equipment as much as you do. They're called "thieves" and they can strike anywhere. Take your rig with you when you leave the car, if possible. Locked doors are mandatory and a security system isn't a bad idea.

### On the Road Again

With contest season in full swing, I'm going to attempt HF *contest* mobile. By the time you read this, I'll be trying my hand at the November Sweepstakes from the comfort of my Saturn. Our Headquarters antenna expert, Dean Straw, N6BV, has encouraged me to drive to the Connecticut shoreline and park within 100 feet of Long Island Sound. He says the salt water may enhance my signal quite a bit. I'm game for a little experimentation, but if there is a nor'easter blowing I'll have to be careful not to wind up *in* the water. I also want to try 2 and 6-meter mobile VHF contesting from the tops of some of our hills and ridges. As long as there's a paved road, I'm on my way!

If you're in the mood for something different, or if antenna restrictions keep you from getting on the air, I highly recommend the mobile alternative. If I can install a reasonably efficient HF station in my "plastic" Saturn, you can put one in your car, too. And then the next time you're stuck in traffic, you can just sit back, relax, and do a little hamming. It certainly beats grinding your teeth and pounding on the steering wheel!

# Test Your Knowledge!

It's mighty hard to make contacts without "contact."

Even if you've never soldered, or even twisted two wires together, connections are a big part of your ham radio experience.

1. The most common series of serial data connectors is the ...

- a. DB
- b. ACRS
- c. F
- d. crimp-terminal

2. The part of a cable connector that protects the connections to the pins or sockets is the ...

- a. strain relief
- b. flange
- c. backshell
- d. boot

3. Which is *not* a coaxial connector style?

- a. Molex
- b. SMA
- c. UHF
- d. BNC

4. North-American modular telephone wall jacks are designated ...

- a. RJ45
- b. DB-25
- c. AX.25
- d. RJ11

5. RCA connectors are also known as (phone/phono) connectors.

6. Connectors that maintain a transmission line's voltage-to-current ratio across the junction are known as ...

- a. minimum-energy
- b. low-loss
- c. constant-current
- d. constant-impedance

7. When wrapping a bare wire around a screw terminal, one should make (one/one-half) turn around the screw in the (clockwise/counter-clockwise) direction.

8. Which type of crimp-terminal is often called a "quick disconnect?"

- a. spade
- b. ring
- c. fork
- d. hook

9. When installing a PL-259 coaxial connector, what part must go on first?

- a. body
- b. backshell
- c. center pin
- d. jacket

10. Bayonet-style connectors attach to their mates by a (partial/multiple) turn.

11. A connector carrying high-currents must have lots of ...

- a. contact surface area
- b. low-leakage insulation
- c. temperature stability
- d. moxie

12. Match the connector plating material with the characteristic for which it is most widely used.

a. gold	e. solderability
b. silver	f. corrosion resistance
c. tin	g. conductivity
d. phosphor bronze	h. flexibility

13. The connector that changes a transmission line from coaxial cable to waveguide is called a ...

- a. transition
- b. transformation
- c. transducer
- d. transplant

14. To prevent corrosion, what is applied to an electrical connection?

- a. thermal grease
- b. anti-oxidation compound
- c. joint compound
- d. lithium grease

**Bonus!** Bare wire ends are named for what animal part?

22916-107th Ave SW  
Vashon, WA 98070

## Total Your Score!

There are a total of 18 possible answers in this quiz, not including the bonus question. Give yourself 1 point for each correct answer.

13-18 You're definitely a "well-connected" individual!

7-12 The cables are a little loose in your memory sockets, but you're doing okay.

1-6 Your connector knowledge is unplugged!



**Bonus:** Pigtail!

facets where they combine with metals to form nonconductive oxides.

14-15-Antioxidants in some media to another very effectively.

13-14-These are very interesting structures, converting electromagnetic waves from one media to another.

12-11-Materials, like solder, and phosphor bronze stands up well under repeated insertion/removal cycles.

10-9-Contact resistance (and therefore heating and resistive loss) is reduced by increasing contact area.

7-6-These connectors minimize power reflections due to impedance mismatches at the connector.

5-4-This design was popularized in the filters when this style of connector was used on phonoraphs.

3-2-A backshell usually holds the cable steady within the connector to prevent flexing and stress on the wire-to-pin/socket connection.

1-0, partial-Bayonet connectors (such as BNC) use a pin sliding along a track to hold the shell firmly onto the matching connector, snapping along a detent in the shell to hold the connector pieces together.

9-8-The backshell—many hams forget this step!—of the connector—many PCs are DB-style connectors.

8-7-Spade terminals are held into a mating socket by friction.

6-5-Phono—This design was popularized in the filters when this style of connector was used on phonoraphs.

4-3, a-d—A backshell usually holds the cable steady within the connector to prevent flexing and stress on the wire-to-pin/socket connection.

2-1-Serifal connectors on modems and many PCs are DB-style connectors.

Answers  
A—Serifal connectors on modems and many PCs are DB-style connectors.

# The Crystal Radio

What's old is new again!

**E**ven a casual auditor of the amateur bands will conclude that the hobby is largely populated by wizened old geezers—and I'm one of them. This is a sad situation because most of us entered Amateur Radio as kids. If ham radio is to continue for generations to come, we must get youngsters interested in radio communication while they're still in grammar school and still capable of wonder. We need to reach them while they are still asking questions about everyday matters (that all too often go unanswered) such as, "Why does it get light in here when I push this thing?"

Reaching today's kids won't be easy. With the Internet, cellular telephones and other forms of global communication commonplace in their lives, the true magic of radio lies buried beneath the technology. We must strip away layers upon layers of complicated hardware and reveal radio in its purest form. The perfect tool to achieve this goal is the "lowly" crystal receiver.

Imagine the curiosity you'll inspire when you demonstrate a radio that has no obvious power source whatsoever! The simple crystal receiver described in this article works surprisingly well. It's selective and produces robust headphone volume. I've been able to tune several local AM broadcast stations with ease. Best of all, it's inexpensive, uses readily available parts, and can be built by a youngster (with a little guidance). Of course, adults will love this little receiver, too.

There is a fascinating resurgence of interest in crystal radios. Even hams normally accustomed to owning rigs with four-digit price tags are rediscovering the joys of simple, "powerless" reception. To get a taste of what is going on, pick up a copy of *Crystal Set Projects* from the Xtal Set Society, Box 3026, St Louis, MO 63130; tel 314-725-1172, or visit their Web site at <http://www.midnightscience.com>. (The book was reviewed in the August, 1997 *QST*, page 102.)

## About the Circuit

The circuit shown in Figure 1 was developed in the early '30s by Elmer G. Osterhoudt. Selectivity problems plagued most crystal sets of the day due to the proliferation of broadcast stations. Elmer devised a solution. He determined that poor crystal receiver selectivity was caused by the headphones swamping the tuned circuit and lowering its Q. The net result was an inability to separate individual signals. Elmer improved selectivity considerably by connecting the detector near the cold (ground) end of the tuned circuit to minimize the swamping.

Capacitor C2 is used to match the antenna system, and C3 is the main tuning capacitor. Absent from this circuit is the finicky galena-and-catwisker detector. It has been supplanted by a 1N34 germanium diode that is connected near the grounded end of the tuned circuit that includes coil L1. C1 is an RF bypass capacitor.

## Headphones

You must use high-impedance headphones (2000  $\Omega$  or greater) with crystal receivers. If you attempt to use common 8- $\Omega$  headphones, you'll have very disappointing results. You'll find high-impedance headphones at hamfest flea markets, but if you're not

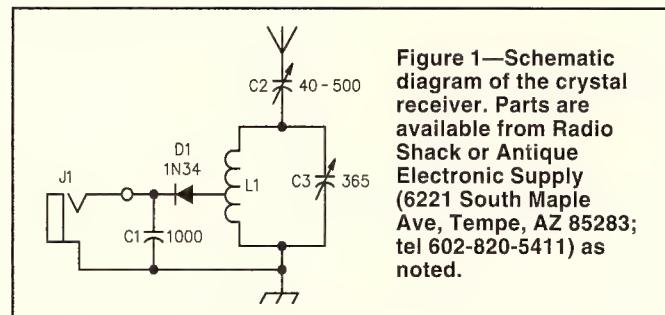


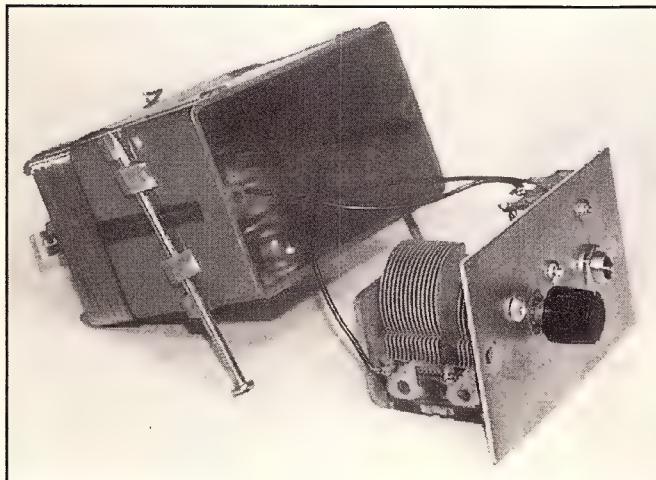
Figure 1—Schematic diagram of the crystal receiver. Parts are available from Radio Shack or Antique Electronic Supply (6221 South Maple Ave, Tempe, AZ 85283; tel 602-820-5411) as noted.

C1—1000 pF mica or disc ceramic trimmer (Radio Shack 272-123)  
C2—40 to 500 pF trimmer capacitor (Antique Electronic Supply CV-263)  
C3—365 pF variable capacitor (Antique Electronic Supply CV-231)  
D1—1N34 germanium diode (Radio Shack 276-1123)  
J1—1/4-inch, 2-conductor headphone jack (Radio Shack 274-252)  
L1—35 feet of 22-gauge enamel wire. See text. (Radio Shack 278-1345)  
Fahnestock clips (Antique Electronic Supply SH-11-4034)  
2000- $\Omega$  headphones (Antique Electronic Supply PA-466)

up to the hunt, you can buy them from Antique Electronic Supply (see Figure 1).

## The Importance of a Good Antenna System

Since the crystal receiver depends completely on the energy from the transmitted signal, you need to gather as much signal out of the air as possible! Remember that this receiver is designed to tune the AM broadcast band. A half-wavelength dipole cut for about 1 MHz would be ideal, but few of us own enough real estate to accommodate a 500-foot long antenna. The practical solution is



**Plastic electrical outlet boxes make terrific enclosures. Note that I've mounted the main tuning capacitor, C3, and the headphone jack on the front using copper-clad PC board.**

to simply use an end-fed wire about 100 feet in length. You'll also need to provide a connection to an Earth ground (a cold-water pipe may suffice). With the proper antenna system, you should be able to receive most of the AM stations in your area. If you live in a rural location without an AM broadcaster nearby (within about 50 miles), try using even more antenna wire. Just string it over trees, bushes, or any other supports.

### **Construction**

You can build a crystal receiver into almost anything. I used plastic electrical outlet boxes. They're available at home centers and hardware stores. They are attractive, rugged and inexpensive. They even serve as forms for winding the coil. I made the front panel of my box from a piece of copper-clad PC board. You can cut this material into the proper shape using a hacksaw, and it is easily drilled for mounting parts.

For C3, a miniature variable capacitor salvaged from an old AM-only radio will work, but a single-section air variable is better. If you don't have these capacitors in your junk box, don't despair. You can order one from Antique Electronic Supply.

L1 is wound on the outside rear portion of the enclosure and consists of 32 turns of 22-gauge enamel-covered wire. The coil is tapped nine turns from the grounded end. The tap is made by tightly twisting about 1 inch of the magnet wire and scraping off the enamel insulation. You can secure the windings to the enclosure with transparent plastic tape.

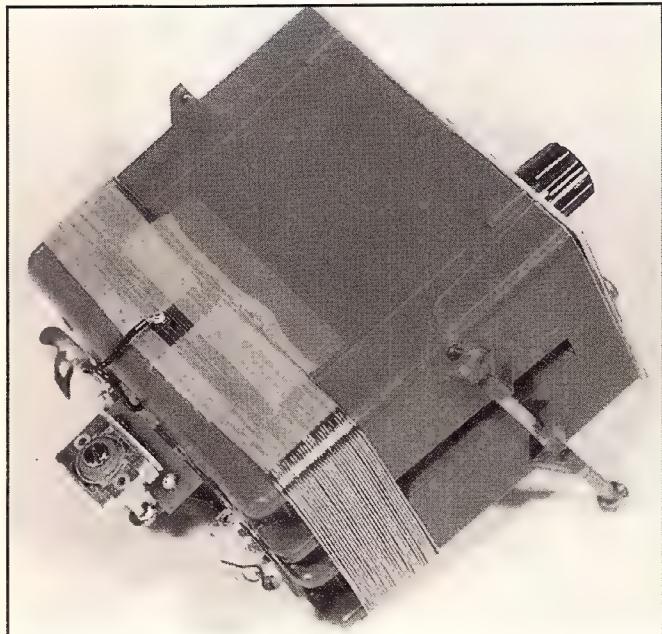
The antenna trimmer capacitor (C1) and the Fahnestock clips for the antenna and ground connections are mounted on the rear of the enclosure. The tuning capacitor, phone jack and detector are mounted on the front panel. Interconnecting wires are fed through holes in the enclosure and soldered to the trimmer capacitor, ground and cold connections.

### **Operating Adjustments**

Connect the antenna, ground and headphones. Tighten the antenna trimmer capacitor C2. Slowly adjust C3 to tune in the stations. Note the number of stations and log their call letters and frequencies. Readjust C1 to provide the best trade-off between volume and selectivity. If you're using your crystal radio near a particularly strong broadcast station, removing the ground connections will often improve selectivity (with some reduction in volume).

### **Use Your Radio as a Teaching Tool**

You can use your crystal radio to teach a number of important concepts. For example:



**The rear view of the crystal radio enclosure. You can easily see the windings of coil L1 held in place with transparent tape.**

**Inductance:** Applying the "right hand rule," the coil for the tuned circuit can be used to explain how a magnetic field is developed by electron flow through a conductor, and how the magnetic field is increased by forming the conductor into a coil.

**Capacitance:** Varying capacitance may be illustrated by simply observing how the total area increases as the rotor plates mesh with the stator plates. The compression trimmer capacitor (C1) illustrates the function of a dielectric other than air. It also shows how the capacitance can be varied by changing the separation between the plates.

**Resonance, modulation and detection:** You can teach these concepts by inviting your student to tune in a station while you display the modulated RF on an oscilloscope! Move the 'scope probe from one side of diode D1 to the other to illustrate "before" and "after."

**Magnetism and transduction:** High-impedance headphones are ideal instructional aids to demonstrate these ideas. Disassemble a pair of headphones and show your students what's inside. Touch the permanent magnet with a screwdriver so they can see that it is indeed magnetic. Explain how the detected signal flows through the tiny headphone coil, creating a magnetic field that adds or subtracts from the field produced by the permanent magnet. This causes the metal diaphragm to vibrate, creating sound! What began as electrical energy has become mechanical energy—transduction.

### **Summary**

Throughout the years, the simple crystal radio has spawned tens of thousands of radio amateurs, engineers and electronic hobbyists. And despite the antiquity of its design, it is still an effective tool for recruitment and instruction. A crystal radio is a delightful device, and the perfect way to introduce the wonder of radio to a young mind—or rekindle it in your own!

# HF QRP "Foxhunting"

Here's a fun way to spend your wintertime weekday evenings!

**S**ome find it maddening, but nightly cacophony on 40 meters is music to my ears! It was on Tuesday evening, October 8, 1996 at 0100 UTC, that I dived headlong into the mass of signals and experienced my first moment in the spotlight. When it was over, I was trembling with excitement. If ham radio was meant to be fun, this was *it*!

## Not Your Usual Foxhunt

To call what we do a "foxhunt" is a little misleading. Most hams envision foxhunts as VHF activities where intrepid operators roam the countrysides with portable antennas in search of hidden transmitters. Yes, our "foxes" are hidden, but not by physical objects. And, yes, we use antennas to hunt our quarry, but they aren't usually portable! Our territory isn't limited to a few square miles—it encompasses all of North America and beyond.

The fox station begins the hunt by sending a Morse CQ on 40 meters at or near a predetermined frequency (more details in a moment). The hounds—everyone else who is participating—listen carefully. If a hound hears the fox, the hound answers the CQ, completes the proper exchange, and then moves on to work other hounds who might also be on the air. In the meantime, the fox calls CQ again on the same frequency (or nearby, if interference forces a move). Another hound answers and the game goes on.

What's so hard about this you ask? Well, the fox and hounds are all running low power (QRP)—less than 5 W. They are doing battle with each other and, worst of all, the appalling interference that plagues much of the 40-meter band at night. This foxhunt is a test of operator skill and resolve!

## The Internet QRP Club

The HF QRP foxhunts are the brainchild of Chuck Adams, K5FO, founder of the Internet QRP Club. The central purpose of the club is to use the Internet as a tool to bring together QRP enthusiasts from around the world. Members can sign up for the QRP-L e-mail reflector<sup>1</sup> and receive messages (advice, comments, or whatever) from other QRP hobbyists automatically. Or, they can surf the club's Web site at <http://qrp.cc.nd.edu/QRP-L/index.html>.

The Internet QRP Club foxhunts occur Monday through Thursday from October through March on both the General and Novice/Technician Plus portions of 40 meters. The starting frequencies are the recognized 40-meter QRP calling frequencies of 7.040 MHz and 7.110 MHz. Dates and times are established by the foxes before the season starts so that everyone will know which call signs to expect, and when. There can be more than one fox on the air each week, and sometimes more than one on the air each night!

The results of each hunt are posted on the QRP-L e-mail reflector and on the Internet QRP Club Web. Points are awarded to both the foxes and the hounds. You earn one point for every contact with a General, Advanced or Amateur Extra operator and five points for every contact with a Novice or Technician Plus.

## My Baptism of Fire

As a relatively new Technician Plus with little on-air experi-



ence, I was reluctant to volunteer as a fox. But when Chuck Adams put out a plea for more Novices and Technicians to participate, I decided to give it a try.

On October 8, my first day as the fox, I had more than a little trouble concentrating at work. I came home early and instructed my family that I would not be available for at least two hours. If they could keep the noise level down, I would really appreciate it. (In a house with five children and two adults, it's not always easy to enjoy a quiet evening!)

At 7:00 PM local time I started calling CQ on 7.115 MHz, the closest clear frequency to 7.110 MHz. As soon as I finished sending the last long K, it sounded like my kids had found 30 practice keys and were banging on them at once! I didn't know what to do, so I simply listened. Soon enough it stopped and I sent QRZ? DE KB0ROL K.

Pandemonium erupted again. There were at least a dozen people sending their calls. I could sort out one or two stations, but the pileup sounded like a continuous buzz! I listened again and was able to pick out one tone that was a little different from the others. With extreme concentration I could distinguish the call sign KK5RO. I immediately replied with KK5RO KN and we swapped the necessary information. As soon as I sent SK, the chaos returned.

The next two hours passed with amazing speed. I had to change frequencies twice, but I bagged—or was bagged—by 15 hounds in 11 states.

As the season went on I served as the fox twice each month. From my home just outside Denver, Colorado, I worked Washington, California, Michigan, Texas, Connecticut, Florida and most of the states in between. Not bad for the absolute bottom of the solar cycle.

### Try It!

Do you want to join in the fray? It's surprisingly easy. Even if you don't have Internet access, listen around the 40-meter QRP calling frequencies at 0100 UTC, Monday through Thursday. Find the pileup and, chances are, you've found the fox. Of course, if you can get to the Web, check out the Internet QRP Club site for the latest scores and schedules. Remember that the dates and time are in UTC, so adjust for your location.

The exchange is simple: RST; state, province or country; name, QRP-L number or power output. For example ...

(fox transmissions are in bold type)

**CQ CQ CQ FOX DE KBØROL KBØROL KBØROL K**

KBØROL DE KK5RO K

**KK5RO UR RST 449 449 CO CO BRAD BRAD NR 361 361 BK**

KBØROL UR RST 579 579 OK OK VERNON VERNON NR 280 280 BK

**R R R TNX VERNON 73 SK KK5RO DE KBØROL BK**

R R R 73 KBØROL DE KK5RO SK

If you don't have a QRP-L number and your power is 4 W, just send your "number" as 4W. (You can get your own QRP-L number by joining the club via its Web site.) Don't be afraid to ask for

repeats, but, as in all contests, you should listen before you call. Don't be surprised if you are asked to repeat or even QRS (slow down). While a lot of the people who participate in the hunt can easily rag chew at over 40 WPM, they'll slow down to match your speed.

Don't forget to crank your power down (under 5 W) and join in. But please remember, if you can't hear the fox right away, don't call. You may be right on top of his signal, effectively wiping him out. Just be patient and listen.

What do you get for participating? Other than all the fun, and it is a lot of fun, at the end of the 1996 season there were a number of prizes awarded (all donated by club members). These included complete transceiver kits, keyer kits, certificates and so on. The prizes are usually determined by the end of the hunt season. If nothing else, you'll have a stack of QSL cards from around the country!

See you this winter!

### Notes

**1**QRP-L is an Internet e-mail reflector. All messages sent to the reflector address are automatically resent to everyone on the subscriber list. This allows the group to share comments and information. You *do not* have to join the Internet QRP Club to subscribe to the reflector.

To become a subscriber, send an e-mail message to: [listserv@lehigh.edu](mailto:listserv@lehigh.edu). In the body of the message send: subscribe qrp-l <your name><your call>. You will receive instructions on how to participate. Be careful though; this list generates a lot of traffic. Print the instructions and keep them handy in case you need to change your "settings." You can also subscribe to the QRP-L reflector directly from the Internet QRP Club Web site at <http://qrp.cc.nd.edu/QRP-L/index.html>.

15879 E Arkansas Dr  
Aurora, CO 80017  
e-mail [bmuq@gwi.com](mailto:bmuq@gwi.com)



### SPEAKER MIKES FOR YAESU FT-50R FROM PREMIER COMMUNICATIONS

◊ To accommodate Yaesu FT-50R owners (and others who have rigs with newer Yaesu mike connectors), Premier Communications has expanded its line of speaker mikes to include the SPM-102, a full-size hand mike; the SPM-202 and '202E, rugged lapel mikes with PTT switches (receive audio is routed to "bud"-style earpieces), and the SPM-302, a lightweight hand mike with a volume control and a lighted PTT indicator. All models feature external speaker jacks and sturdy plastic cord clips.

Prices: SPM-102, \$33.95; SPM-202, \$20.95; SPM-202E, \$24.95; SPM-302, \$40.95. For more information, contact Premier Communications, 20277 Valley Blvd, #J, Walnut, CA 91789; tel 909-869-5711, fax 909-869-5710; e-mail [premier@adi-radio.com](mailto:premier@adi-radio.com); <http://www.adi-radio.com>.



### SOLARGIZER BATTERY MAINTENANCE SYSTEM FROM PULSETECH

◊ Designed to eliminate sulfation damage and extend the life of automotive and marine lead-acid batteries by as much as five times, PulseTech's Solargizer Battery Maintenance System also prevents dead batteries and expands battery capacity. Using patented pulse technology (pulsed dc), the solar-powered system reenergizes lead acid batteries and dissolves sulfates that have accumulated on internal battery plates.

Models are available for 12, 24, 36 and 48-V dc vehicle and marine battery systems, including 117-V models for batteries that are stored or used indoors. Prices start at \$59. For more information, contact PulseTech, 3131 Premier Dr, Irving, TX 75063; tel 800-580-7554; fax 214-550-1062; e-mail [ppc@pulsetechproducts.com](mailto:ppc@pulsetechproducts.com); <http://www.pulsetechproducts.com>.



## QST Compares: Economy and No-Frills 2-Meter FM Hand-Held Transceivers

Reviewed by Joel Kleinman, N1BKE  
Associate Technical Editor

With 2-meter H-Ts as popular as ever, the time seems right to compare the features and performance of a new generation of "economy" and "no-frills" models now on the market. Frequently we hear from readers that they're willing to sacrifice gobs of features for ease of use and simplicity in an H-T. Moreover, they don't want to pay for features they don't use. The units in this selection tend to adopt a "most-for-least" philosophy. Although all can be described as small and light, some are decidedly smaller and lighter than others. Some have quite a few features, but others are so basic that they lack even a tone pad. The *most* basic in the group has a fixed telescoping antenna and dry battery pack that uses three AA cells (NiCds are optional).

But the best news may be the prices. The



**Table 1** 2-Meter H-T Features

	<b>ADI AT-201</b>	<b>Alinco DJ-190T</b>	<b>Alinco DJ-S11T</b>	<b>ICOM IC-T2A</b>	<b>Kenwood TH-235A</b>	<b>Midland 73-030</b>	<b>Standard C156</b>
Expanded VHF reception	M	Y	M	Y	M	Y	Y
Memory channels (#)	40 + CALL	40	20 + CALL	40 + CALL	60	73	100
Memory cloning	N	Y	Y (see text)	Y	Y	N	N
Memory names	N	N	N	N	N	N	Y
Programmed range scanning	N	N	N	Y	N	Y	Y
Power output choices	H/M/L	H/L	H/L	H/L	H/L	H/M/L	H/M/L
Standard battery type	NiCd	NiCd	3xAA	8xAA	NiCd	NiCd	4xAA
Standard battery (mAH)	7.2 V (650)	4.8 V (700)	4.5 V (N/A)	9.6 (N/A)	7.2 V (950)	6 V (600)	6 V (N/A)
12 V ready?	Y	Y	O	N	Y	Y	Y
Low-battery indicator	N	Y	Y	Y	N	Y	Y
Auto power off	Y	Y	Y	N	Y	Y	Y
Automatic repeater offset	Y	N	N	Y	Y	Y	Y
Paging (code or tone squelch)	Y	N	N	Y	Y	Y	Y
Priority channel monitoring	Y	N	N	N	N	Y	Y
Keypad	Y	N	N	Y	Y	Y	Y
DTMF autodial memories (#)	N	N	N	Y (5)	Y (5)	Y (8)	Y (10)
CTCSS encoder	Y	Y	Y	Y	Y	Y	Y
CTCSS decoder	Y	O	N	Y	Y	Y	Y
Antenna connector type	BNC	BNC	N/A	BNC	BNC	BNC	BNC
Time-out timer	N	Y	N	N	Y	N	Y
Suggested retail price	\$215	\$219	\$149	\$227	\$230	\$370	\$289
Typical selling price as of 10/97†	\$170	\$173	\$120	\$170	\$173	\$215	\$200

### Key

Y = Standard

O = Optional

N = Not available

N/A = Not applicable

M = With hardware or keypad modification. Details available from manufacturer (may require proof of MARS or CAP license).

†Typical selling prices represent an average of street prices obtained from three equipment retailers, exclusive of any sales, coupons or rebates. We were able to locate only one retailer that carried the Midland 73-030, however.

average street price for our seven H-Ts comes in at just under \$175—the kind of money you once expected to hand over for a *used* H-T! Despite our “no frills” and “economy” designations, many of these units still offer a wide range of features, from CTCSS encoding to extended receive, multifunction scanning and paging. Table 1 provides a quick comparison of features and prices.

All models have a variety of optional accessories that extend the usefulness of the basic transceiver. Those of us who have used the larger and heavier H-Ts of years past found that we missed the comparable speaker size and audio output on these units. Another trade-off was display size and clarity. Most of these radios have small displays that can't do justice to the “flags” (or icons) that designate various functions. All displays can be illuminated for nighttime viewing, and some feature a backlit keypad as well. Power output is in the 1.5 to 2.5 W range for most in the group, although optional battery packs or a 13.8 V supply can raise the ante to as high as 5 W.

In the recent past, we've looked at the Alinco DJ-191, the ICOM T22A, the Kenwood TH-22AT, the Standard C108A, the Standard C178A, and the Yaesu FT-10R and FT-11R (see “Product Review,” *QST*, May 1996). All of these were still on the market as this review went to press.

Our review team, all members of the Headquarters staff, put each radio through

its paces for several days apiece. This allowed us to get a good feel for each radio, and to develop our individual lists of features we liked and those we didn't. The testers were selected for their attention to detail and varying amounts of experience with H-Ts. Thanks to Pete Budnik, KB1HY; Steve Ford, WB8IMY; Jean Wolfgang, WB3IOS; Martin Cook, N1FOC; Dan Miller, K3UFG, Paul Danzer, N1II; and Mike Tracy, KC1SX, and Ed Hare, W1RFI, of the ARRL Lab for their contributions to this review.

### ADI AT-201

ADI/Premier is a relative newcomer to the ham radio market. The company offers radios for VHF and UHF, including a 2-meter mobile and a dual-band H-T. A traditionally designed H-T, the ADI AT-201 feels and looks pretty solid. Ruggedness and general polish (what's sometimes called “fit and finish”) were judged as average. The ADI AT-201 has a husky frame (one user called it “too bulky for me”). ADI says some of its customers say they prefer a full-sized H-T as an alternative to what it called “small radios with tiny buttons.” The nice-sized keypad can be illuminated for nighttime use. Most of the unit's better features are accessible via the keypad.

Reviewers were unimpressed by the smallish display, however. Frequency and memory channel numbers are large and clear,

but some of the other display flags were too small to be seen easily, particularly in less than optimal lighting conditions. The display can be illuminated also.

Audio output was good except at the highest volume. On transmit, audio was judged to be above average for an H-T. One user got reports indicating very natural audio that compared nicely with his regular mobile radio. “Excellent reports received from all contacts!” commented one user. “Some people who know my voice well said I sounded better than on my own H-T.” Users reported that the supplied 7.2-V, 700 mAh NiCd battery pack held its charge well, particularly with the battery save feature enabled.

Our user team's initial programming woes and confusion over how to use the AT-201 were traced to one problem—the *User's Manual*. The one supplied with our radio was for the earlier AT-200. Fortunately, the very handy *Quick Reference Guide* did match our unit, and it was sufficient for most users to figure out the radio. Subsequently, we were able to get the correct manual from ADI—which deserves high marks for its prompt response to our various customer service inquiries. Armed with the correct instructions, we found programming to be fairly simple. It takes four basic steps to put a frequency into a memory, and when you seek an empty memory slot, the AT-201 displays each memory's contents—or a blinking M if it's

### ADI AT-201, serial number 7S40030019

#### Manufacturer's Specifications

Frequency coverage: Receive, 138-174 MHz; transmit, 144-148 MHz.

Power requirements: 5.0-16 V dc. Receive, ≈35 mA; transmit (max, high power), ≈950 mA at 13.8 V dc.

Size (HWD): 5.5×2×1.25 in; weight 13.1 oz.

#### Receiver

FM sensitivity, 12 dB SINAD: 0.32 µV.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: 0.10 µV.

S-meter sensitivity: Not specified.

Audio output: 250 mW at 10% THD into 8 Ω.

#### Transmitter

Power output (H/M/L): 2 W / 2.5 W / 0.35 W, with RBP072 7.2 V battery pack; with external supply, not specified.

Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time (“tx delay”): Not specified.

Note: All dynamic range measurements were made at the ARRL Lab standard spacing of 20 kHz.

\*Measurement was noise-limited at the value shown.

#### Measured in the ARRL Lab

As specified.

As specified.

#### Receiver Dynamic Testing

For 12 dB SINAD: 0.15 µV.

20 kHz offset, 60 dB;\* 10 MHz offset, 82 dB.

61 dB.

IF rejection, 97 dB; image rejection, 77 dB.

At threshold, 0.09 µV.

S9=2.7 µV.

245 mW at 10% THD into 8 Ω.

#### Transmitter Dynamic Testing

2.4 W / 2.4 W / 0.4 W with RBP072 7.2 V battery pack; 5.5 W / 2.7 W / 0.4 W at 13.8 V dc.

63 dB. Meets FCC requirements for spectral purity for equipment in its power output class and frequency range.

Squelch off, S9 signal, 175 ms.

46 ms.



empty—as you scroll through.

Less intuitive was the use of a steady **M** on the display while accessing special functions using the **SET** button, and the use of the **MR/ENT** key to switch between VFO and memory mode. Also, keypad frequency entry is limited. Unlike the other units we looked at (the ones with keypads, that is), to move to 146.685 MHz, for example, you can only enter “4-6-8” from the keypad. You have to give the **CHANNEL** (tuning) knob a twist to add the “5.” Once users got the hang of it, though, they had no problems.

Aside from matching the unit, the AT-201 *User's Manual* was a huge improvement over the AT-200 book. The manual is peppered with illustrations that employ little directional arrows to graphically depict step-by-step instructions. This is a good concept that works for most people. While users could find most needed information about the AT-201 in either the *Quick Reference Guide* or the *User's Manual*, neither contained battery charging instructions. A schematic diagram accompanies the manual.

You'll need to refer to the *User's Manual* or the *Quick Reference Pocket Guide* to master the use of the **FUNCTION** button and other controls. One odd feature was the prominent button on the front panel labeled **SQL**. Surprise! This isn't the squelch control at all; it's the “squelch off” button, which most manufacturers typically call “monitor.” This

allows you to momentarily disable the squelch to listen for a weak signal or to set the volume level in the absence of an actual signal. The *real*, unlabeled squelch control is a nearly invisible knob that sits practically flush atop the unit and that you turn with your fingertip—pretty awkward. On the other hand, most users don't have to adjust the squelch that often.

Much better were the sizable, rubberized top-mounted **VOLUME** and **CHANNEL** knobs. Even the most “ham-handed” user will find these easy to manipulate. The **VOLUME** knob is calibrated with a 0-10 scale, so you can reset it for comfortable listening without having to listen first. This knob also serves as the power switch.

The AT-201 has a variety of useful features, and the new manual makes it easier to figure them out. Most users considered the AT-201 at least an average performer. One called it “a good meat-and-potatoes radio.”

**Manufacturer:** Premier Communications, 20277 Valley Blvd, No J, Walnut, CA 91789; tel 909-869-5711; fax 909-869-5710; e-mail [premier@adi-radio.com](mailto:premier@adi-radio.com); <http://www.adi-radio.com/>. Manufacturer's suggested retail price, \$215.

## ALINCO DJ-190T

Despite having only three knobs on the front panel and no keypad, it might not be fair to categorize the Alinco DJ-190T as a

“no frills” H-T. This rugged, slim unit includes many of the bells and whistles now available on more expensive H-Ts.

Its readout is large and clear with bold numbers and characters—one reviewer called it “outstanding!” Its display is the biggest of the bunch and reminiscent of the display on the big brother DJ-191T. You can light the display by pressing the **LAMP** button on the side. This was the only H-T in the group that included a drop-in charger stand. Our radio came with a 4.8 V, 700 mAH battery, which provides 1.5 W in the high-power setting. Most, but not all, users got several days of use from a single charge. Most considered battery life above average.

Indicative of the quality built in to this H-T is the metal belt clip. Although it's a minor point, one reviewer commented, “I especially like it because the radio is secure on my purse, too.” Another called the controls “very solid.” The rubber dust covers for the speaker/mike and dc jacks stayed in place, too—not the case with all the radios we looked at.

Programming a memory channel on this radio involves five steps but was judged to be relatively simple. One user called it “a snap.” Setting the various functions takes a bit of getting used to, but the manual is generally clear and well organized. One reviewer called the DJ-190T “very easy to use” once it's set up. Several others shared that senti-

### Alinco DJ-190T, serial number T001221

#### Manufacturer's Specifications

Frequency coverage: Receive, 136-174 MHz; transmit, 144-148 MHz.

Power requirements: 4.8-13.8 V dc.  
Receive, ≈50 mA; transmit (max, high power), ≈1.5 A at 13.8 V dc.

Size (HWD): 5.75×2.25×1 in; weight 11.4 oz.

#### Receiver

FM sensitivity, 12 dB SINAD: 0.16 μV.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: Not specified.

S-meter sensitivity: Not specified.

Audio output: 200 mW at 10% THD into 8 Ω.

#### Transmitter

Power output (H/L): Power levels with EBP37N 4.8 V battery pack, not specified;  
≈5 W / ≈0.6 W at 13.8 V dc.

Spurious signal and harmonic suppression: 70 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time (“tx delay”):  
Not specified.

Note: All dynamic range measurements were made at the ARRL Lab standard spacing of 20 kHz.

\*Measurement was noise-limited at the value shown.

#### Measured in the ARRL Lab

Receive, 130-174 MHz; transmit, as specified.

As specified.

#### Receiver Dynamic Testing

For 12 dB SINAD: 0.15 μV.  
20 kHz offset, 58 dB;\* 10 MHz offset, 68 dB.  
59 dB.

IF rejection, 114 dB, image rejection, 67 dB.  
At threshold, 0.19 μV.  
Max indication=3.8 μV.  
245 mW at 15% THD into 8 Ω.

#### Transmitter Dynamic Testing

2.0 W / 1.0 W with EBP37N, 4.8 V battery pack;  
6.5 W / 1.0 W at 13.8 V dc.

72 dB. Meets FCC requirements for spectral purity for equipment in its power output class and frequency range.

Squelch off, S9 signal, 40 ms.



ment. Still, there were some rough spots. Adjusting the squelch involves holding down two buttons on the left side while rotating the single control knob. This takes a bit of practice and dexterity. The labels on these three critical side buttons are difficult to read, which can lead to some initial programming confusion.

Users got good reports on transmitted audio—most stations contacted reported it was loud and clean. Received audio is ample, with just some distortion at the highest volume setting. As Alinco has done on some earlier models, including the DJ-191, this H-T uses up and down pushbuttons to adjust the volume. These buttons double in brass for other functions. The volume control is the default, so setting it just right is simple. The display reads out the relative level (0-31).

The 28-page *Instruction Manual* is well-illustrated and nicely designed, but some reviewers thought it could have been *written* more clearly. It contains a detailed table of contents and a quick reference section, both helpful in finding specific information quickly. The manufacturer included a schematic diagram.

One noteworthy feature is what Alinco calls cable cloning. To transfer the entire memory contents from one DJ-190T to another, you just need a couple of mini stereo plugs and some cable. The few easy steps are described clearly in the manual.

Alinco says the DJ-190T also provides for

PC cloning/programming, which requires optional third-party software. RT Systems (800-723-6922) offers the software and cable, item code APK-1, for \$35. (This also works with the DJ-191T.)

Nearly everyone on the review team expressed disappointment at the lack of a keypad, but no one missed the paging function (available on most of the other radios in the test group). The absence of the tone pad also seemed to be why most major dealers were not regularly stocking the DJ-190T, but they might want to rethink that philosophy. Our users *liked* the back-to-basics design with a minimum of bells and whistles. "Everything the average user would want," one tester said. As it stands now, you'll very likely have to shop around to locate a DJ-190T, and even then it might have to be a special order item.

The lack of the keypad aside, those looking for basic communication might find the DJ-190T just what they need in an H-T.

**Manufacturer:** Alinco Electronics, 438 Amapola Ave, No 130, Torrance, CA 90501; tel 310-618-8616; fax 310-618-8758; e-mail [alinco@alinco.com](mailto:alinco@alinco.com); <http://www.alinco.com>. Manufacturer's suggested retail price, \$219.

## ALINCO DJ-S11T

At first blush, the Alinco DJ-S11T "mini power transceiver" almost seems *too* small and *too* simple. But the DJ-S11T is no mere novelty. It's the smallest radio in the pack, has a small, fixed telescoping antenna, uses three AA cells (you can use NiCds too), has

no keypad, not much of a manual (it barely qualifies as a *brochure*), and puts out about 300 mW. Yes, this is the "most basic" model referred to earlier! It's also the least expensive. I'm not sure if I can explain why, but given a chance to prove itself, this radio grows on you. In any event, it keeps a low profile and weighs in at just over 7 ounces.

Some of the features packed into this tiny frame include an external power jack, external mike and speaker jacks, monitor function, simple change between VFO and memory modes, lamp, auto power off, high and low power (yes, 50 mW!), scan, shift and call functions, alarm, courtesy beep, key-stroke beep, CTCSS encoder, offset shift indicator and channel display mode.

Reviewers gave the display good marks, considering its small size. It can be illuminated. They especially liked the fact that you can run the DJ-S11T for quite a while on a fresh set of AA cells (it has an automatic battery saver function). Audio output was deemed to be on the low side, leading several reviewers to suggest an external speaker mike for mobile use or in a noisy environment. Users noted a fair amount of distortion at the highest volume setting.

For such a small, light radio, overall quality is very good. On the downside, the built-in "fold-out" nine-inch telescoping antenna can flop over on occasion when fully extended. There's no way to connect the unit to an external antenna either, which complicated testing somewhat and will likely con-

### Alinco DJ-S11T, serial number T003447C

#### Manufacturer's Specifications

Frequency coverage: 144-148 MHz, receive and transmit.

Power requirements: 3.6-5.5 V dc. Receive,  $\approx 33$  mA; transmit,  $\approx 260$  mA at 4.5 V dc.

Size (HWD): 3.9×2.1×1 in; weight 7.1 oz.

#### Receiver

FM sensitivity, 12 dB SINAD: 0.18  $\mu$ V.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: Not specified.

S-meter sensitivity: Not specified.

Audio output: 100 mW at 10% THD into 8  $\Omega$ .

#### Transmitter

Power output (H/L): 0.34 W at 4.5 V dc (3×AA batteries); low power, 0.05 W with external supply, not specified.

Spurious signal and harmonic suppression: Not specified.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): 108 ms. Not specified.

Note: All dynamic range measurements were made at the ARRL Lab standard spacing of 20 kHz.

#### Measured in the ARRL Lab

As specified.

As specified.

#### Receiver Dynamic Testing

For 12 dB SINAD: 0.19  $\mu$ V.

20 kHz offset, 56 dB; 10 MHz offset, 55 dB.

59 dB.

IF rejection, 88 dB, image rejection, 57 dB.

At threshold, 0.15  $\mu$ V.

Max indication=1.5  $\mu$ V.

101 mW at 10% THD into 8  $\Omega$ .

#### Transmitter Dynamic Testing

0.3 W / 0.1 W with 3×AA batteries; 0.3 W / 0.1 W at 5.5 V dc.

54 dB. Meets FCC requirements for spectral purity for equipment in its power output class and frequency range.

Squelch off, S9 signal, 300 ms.



tribute to mixed success on the air. Alinco says it's looking into this issue.

Programming this radio was more of a chore than with some of the others, but most users found it got much easier with practice. The instruction sheet, which can charitably be called sketchy, was one contributing factor. The word "squench" does not appear on the sheet, for example; if there's a way to set the squelch level, Alinco is keeping it to themselves. (No one complained that the squelch didn't work, however; Alinco confirms that it's not user-settable.) Entering a frequency into memory involves just three steps. To access a function, a key may be pressed either alone or at the same time the **FUNCTION** key is pressed. You can access other functions by holding down a key while turning on the power. Other programming functions were judged to be a bit more complicated than on some other radios in the group.

The relatively low power output of the DJ-S11T—coupled with the minimal antenna—made it difficult to impossible to hit some repeaters in this region. Most users felt a better antenna would have compensated for the flea-power transmitter. Once we'd "made the machine," reports varied. For example, one station would report that I was breaking up a bit, while another time I'd be solid copy. Transmit audio was reported to be good. At the low output power setting, it was difficult to hit repeaters more than a mile or so away. Use of a more efficient external antenna would help, of course, but there's no way to do it.

One somewhat unusual feature is the telephone-style "alerting ring" on transmit that sounds for all the world like an electronic telephone ring. You can use it to get the attention of another station. Just press the **UP** or **DOWN** key (this can be switched to the 1750-Hz tone burst used in Europe). You can enable an alarm that sounds when a signal is received, too. Some found the alerting tones tended to confuse—and sometimes annoy—both users and those they contacted. They can be disabled, however.

Despite its insubstantial nature, the instruction sheet even includes a schematic diagram, a couple of illustrations, a quick reference chart, and instructions in four other languages besides English. The type is small, though, and some reviewers had difficulty reading it.

Alinco says cable cloning is available for the DJ-S11T, something our manual didn't mention. Alinco says the manual has been revised to reflect this change. The manufacturer also says it plans to offer PC cloning for the DJ-S11T. This will require optional software that was not available when this review went to press.

Overall, reviewers especially liked the small size of this radio. With the antenna folded down, it fits easily into a shirt pocket, in a purse, or on a belt (with the supplied clip). On the other hand, reviewers missed a "real" manual, the ability to connect to an external antenna, and more power output.

The DJ-S11T might be more useful as a

backup H-T, particularly if you do most of your operating either near a repeater with good "ears" or on simplex—at Field Day, while hiking, or talking across the hamfest, for example. Those who primarily operate mobile or routinely need to hit a distant repeater would probably want to look elsewhere.

**Manufacturer:** Alinco Electronics, 438 Amapola Ave, No 130, Torrance, CA 90501; tel 310-618-8616; fax 310-618-8758; e-mail [alinco@alinco.com](mailto:alinco@alinco.com); <http://www.alinco.com>. Manufacturer's suggested retail price, \$149.

## ICOM IC-T2A

The IC-T2A is a sturdy and well designed radio that has a lot to offer—but you may need help getting it up and running because there are few labels on the controls. That's because the IC-T2A is user programmable. If you don't like the default controls, you can, as one user put it, "roll your own."

The display is one of the smallest in the group. The frequency and memory channel are prominent, but the other flags aren't, particularly in bright sunlight or at an angle. The display is lighted for nighttime use, but the tone pad isn't. One handy feature: the lamp stays on for 5 seconds after the radio is turned on.

The comparatively high audio power paid dividends in the IC-T2A. Reviewers were uniformly positive about the received sound quality, even at highest volume setting. Transmitted audio reports received were good to excellent.

### ICOM IC-T2A, serial number 01215

#### Manufacturer's Specifications

Frequency coverage: Receive, 136-174 MHz; As specified. transmit, 140-150 MHz.

Power requirements: 9.6 V dc. Receive, As specified. standby ≈65 mA; transmit (max, high power), ≈1.4 A.

Size (HWD): 5.5×2.25×1.4 in; weight 14.4 oz.

#### Receiver

FM sensitivity, 12 dB SINAD: 0.18 µV.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: 0.18 µV

S-meter sensitivity: Not specified.

Audio output: 350 mW at 10% THD into 8 Ω.

#### Transmitter

Power output (H/L): 4.5 W / 1 W with BP194 battery tray; with external supply, not specified.

Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): 144 ms. Not specified.

Note: All dynamic range measurements were made at the ARRL Lab standard spacing of 20 kHz.

#### Measured in the ARRL Lab

#### Receiver Dynamic Testing

For 12 dB SINAD: 0.15 µV. 20 kHz offset, 53 dB; 10 MHz offset, 73 dB.

51 dB.

IF rejection, 94 dB, image rejection, 116 dB.

At threshold, 0.13 µV.

S9=0.8 µV.

361 mW at 10% THD into 8 Ω.

#### Transmitter Dynamic Testing

4.2 W / 0.8 W with BP194 battery tray (8×AA NiCds); 4.2 W / 0.8 W at 9.6 V dc.

67 dB. Meets FCC requirements for spectral purity for equipment in its power output class and frequency range.

Squelch off, S9 signal, 175 ms.



The supplied BP-194 battery case contains eight individual AA NiCd cells instead of the typical monolithic battery pack. ICOM says it should last 3.5 hours between charges, but there is a battery saver function to help extend that. You can replace the NiCds with alkalines for a bit more power output if you want—not that you'll necessarily need it. At more than 4 W, the output power of our IC-T2A was the highest of the seven units we looked at while running off the internal batteries.

As for ruggedness, the radio got high marks. While one reviewer thought it was a bit on the heavy side (at just over 14 ounces, it's the heaviest of the bunch), everyone liked how it felt in the hand. A couple of users compared it to a commercial radio in look and feel.

Figuring out the default button functions requires reading the *Instruction Manual* or knowing how to use the built-in Guide—which is like the “Help” file on a PC program. This is how I learned that the default setting for **P1** is the scan button, and that the default **A** button toggles between VFO and memory modes. The Guide system is contextual. Pressing a key after pressing the **#** key provides a description of that key's function as “crawl text” on the full display. ICOM says it now offers a free pocket guide “to simplify customizing.” IC-T2A owners can write ICOM for a copy.

Once you get the hang of programming, the radio provides lots of flexibility. If you like to program, you'll have fun with this one. The neat thing about it is that you can custom-

ize eight buttons, P0 through P4 and A through D, to handle functions you use a lot. Once you've customized a button, the radio's Guide function is there to remind you what you've programmed. Very nice! Programming a frequency into a memory requires five steps.

The 40-page manual sports nice looking drawings and tables that make it easy to follow. There is no schematic diagram.

Although you don't want to activate a push-to-talk button accidentally, this one requires more pressure than the others. As with a stick shift in heavy traffic, operating the PTT when you're having a lengthy conversation with short segments can be tiring.

One reviewer experienced an anomaly that others didn't. The transceiver locked up twice, and nothing short of resetting everything could get it out of the locked-up condition.

One potentially useful feature is cloning. With optional software and a cloning cable (CS-T2 software; OPC-474 or OPC-478 cable from ICOM), the programmed contents of one IC-T2A can be transferred to another, as well as from a PC to the IC-T2A. This also enables use of the ANI (automatic number identification) mode, a selective calling system that's similar to paging. The IC-T2A is the only transceiver in this group to offer tone scan capability.

If you're not satisfied with “cookie cutter” H-Ts but enjoy programming and learning to use advanced functions, this radio might very well cut the mustard for you.

*Manufacturer:* ICOM America Inc, 2380

116th Ave NE, Box C-90029, Bellevue, WA 98004; tel 425-454-8155; fax 425-454-1509; e-mail [75540.525@compuserve.com](mailto:75540.525@compuserve.com) (tech support); <http://www.icomamerica.com>. Manufacturer's suggested retail price, \$227.

## KENWOOD TH-235A

This definitely no-frills H-T includes a tone pad, but it offers a minimum of buttons and controls for ease of operation. It's the tallest unit of the group (not counting the rubber ducky).

The display is small, which means some display symbols and icons are too small to be seen easily. The important stuff—the frequency and memory address—is sufficiently large and clear if viewed straight on. Viewing the small stuff at an angle is a challenge under all lighting conditions. The display can be illuminated for nighttime viewing.

Our unit came with a 7.2 V, 950 mAh NiCd battery pack—pretty generous for an economy model H-T. Most users considered battery life good to excellent. At a full charge, our review radio cranked out 1 W more than its 1.5 W specified output. That's a healthy bonus.

Because this radio is so devoid of the controls that bristle from most other H-Ts, it almost looks generic. Okay, so maybe it's not exciting to look at, but apparently Kenwood's thinking here was that most hams prefer useful features and good quality to head-turning looks. Fit and finish are good, with one exception: The review radio's tuning control

### Kenwood TH-235A, serial number 80905312

#### Manufacturer's Specifications

Frequency coverage: 144-148 MHz, receive and transmit.

Power requirements: 7.5-16 V dc. Receive, ≈50 mA; transmit (max, high power), ≈1.3 A at 12 V dc.

Size (HWD): 6×2.25×1.25 in; weight 12.9 oz.

#### Receiver

FM sensitivity, 12 dB SINAD: 0.2 µV.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: 0.13 µV

S-meter sensitivity: Not specified.

Audio output: 280 mW at 10% THD into 8 Ω.

#### Transmitter

Power output (H/L): 1.5 W / 1 W with PB36, 7.2 V battery pack; 5 W / 1 W at 13.8 V dc.

Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (to 50% of full audio output): Not specified.

Receive-transmit turn-around time (“tx delay”): Not specified.

Note: All dynamic range measurements were made at the ARRL Lab standard spacing of 20 kHz.

\*Measurement was noise-limited at the value shown.

#### Measured in the ARRL Lab

Receive, 136-174 MHz; transmit, 144-148 MHz.

As specified.

#### Receiver Dynamic Testing

For 12 dB SINAD: 0.14 µV.

20 kHz offset, 63 dB;\* 10 MHz offset, 80 dB.

61 dB.

IF rejection, 98 dB, image rejection, 133 dB.\*

At threshold, 0.10 µV.

No signal strength indicator.

451 mW at 10% THD into 8 Ω.

#### Transmitter Dynamic Testing

2.5 W / 1.0 W with PB36, 7.2 V battery pack; 4.7 W / 1.0 W at 13.8 V dc.

64 dB. Meets FCC requirements for spectral purity for equipment in its power output class and frequency range.

Squelch off, S9 signal, 105 ms.

38 ms.



knob could easily be pulled off (and perhaps lost if it should be removed by a youngster). The secondary labels present on most other radios in this group are nearly absent, which means you'll need to keep the manual nearby until you memorize the functions.

The review team found that programming the TH-235A was a pleasure. It involves just three steps. This was deemed the simplest of all the radios in this review group to program. As one user enthused, "I was on the repeater within 60 seconds of removing it from the box." Other functions (the ones that use keys with labels, that is) are intuitive. Once programmed, the radio works very well indeed. "Can't be any easier," one user declared.

Reports on transmitted audio were a mixed bag. Some of those contacted reported strong, clear signals, while a few reported low or less-than-natural sounding voice quality. This radio supplies more than 400 mW of audio to its little speaker, so there's lots of receive audio, but the unit can distort at high volume.

The nicely illustrated *Instruction Manual* has a great quick start section plus an index but no separate quick reference guide, which some users missed. Kenwood says a quick reference adhesive label for the TH-235A is available upon request. Drawings are professionally rendered, making it simple to follow the instructions. Tables are likewise clear and straightforward. One user called it the best manual of the group. There is no schematic diagram, but Kenwood says the optional

TH-235A *Service Manual* includes one.

Overall, reviewers liked this radio for its simplicity. "As basic as I have seen and no problem to use," summed up one user. The memory-to-VFO transfer capability is impressive. Simply pressing the **F** and **VFO** buttons transfers the complete contents of the memory channel to the VFO. As the manual points out, this is useful while searching for other stations or for a clear frequency near the selected memory channel.

**Manufacturer:** Kenwood Communications Corp, 2201 E Dominguez St, Box 22745, Long Beach, CA 90801-5745; tel 310-639-5300; fax 310-631-3913; <http://www.kenwood.net>. Manufacturer's suggested retail price, \$230.

### MIDLAND 73-030

Back in the early days of VHF repeaters, Midland offered some crystal-controlled and synthesized mobile transceivers (the company still has a following among CBers). Now, Midland is back in the amateur market with (among other products) this 2-meter H-T, which the manual touts as a "palm size FM paging transceiver." And that it is. This comfortably compact unit will also fit in a shirt pocket, although it's heavy enough to remind you it's there.

Midland says this transceiver has been available in Europe for some time now, but it's not well known in the US. In fact, we had trouble finding a dealer that regularly stocks the 73-030. Even the dealer that sold us our

unit has since discontinued carrying it, so you could have trouble getting your hands on one. Midland says it's working to change this situation.

The 73-030 has a traditional **PWR/VOL** knob at the top, next to the not-so-traditional **ENC/SQ** (tuning and squelch) dial. This H-T also has a tone pad with small but well separated buttons. A bit puzzling is the tone key labeled **FM** (the #7 key on the keypad) that allows the various controls to be set. When **FM** is pushed, a tiny F (for "function," one can assume) appears in the display.

Reviewers found the display small but legible; it has good-sized numbers, but some "over 40" reviewers had difficulty reading the smaller legends. The tone pad is backlit for clear visibility at night.

On transmit, most stations gave very good or excellent reports on transmitted audio, but a couple of testers got reports that audio was "muffled" when close-talked, and others got reports that audio was "a bit low." Audio output on receive was judged to be above average, particularly for a small speaker. "Output was great, even at full volume in a noisy environment" raved one reviewer.

Battery life was likewise excellent—one reviewer used it for an hour a day for a week and didn't need to charge the battery pack. The supplied NiCd battery pack is rated at 6 V at 600 mAh.

The H-T has a solid feel to it and strongly resembles the Kenwood TH-22AT we reviewed last year. Controls and buttons are

### Midland 73-030, serial number 550059

#### Manufacturer's Specifications

Frequency coverage: 144-148 MHz, receive and transmit.  
Power requirements: 5.0-13.8 V dc.  
Receive (squelched),  $\approx$ 42 mA; transmit (max, high power),  $\approx$ 1.5 A at 13.8 V dc.  
Size (HWD): 4.5 $\times$ 2.1 $\times$ 1 in; weight 10.4 oz.

#### Receiver

FM sensitivity: 12 dB SINAD, 0.16  $\mu$ V.  
Two-tone, third-order dynamic range: 60 dB.  
Adjacent channel rejection: 64 dB.  
First IF and image rejection: Not specified.  
Squelch sensitivity: Not specified.  
S-meter sensitivity: Not specified.  
Audio output: 200 mW at 10% THD into 8  $\Omega$ .

#### Transmitter

Power output (H/M/L): With RNB127 6-V battery pack, not specified; 5 W / 0.6 W / 0.18 W at 11 V dc.  
Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): 84 ms.  
Not specified.

Note: All dynamic range measurements were made at the ARRL Lab standard spacing of 20 kHz.

\*Measurement was noise-limited at the value shown.

#### Measured in the ARRL Lab

Receive, 136-174 MHz; transmit, 144-148 MHz.

As specified.

#### Receiver Dynamic Testing

For 12 dB SINAD: 0.16  $\mu$ V.  
20 kHz offset, 58 dB;\* 10 MHz offset, 68 dB.  
59 dB.  
IF rejection, 76 dB, image rejection, >146 dB.  
At threshold, 0.04  $\mu$ V.  
Max indication=4.4  $\mu$ V.  
245 mW at 10% THD into 8  $\Omega$ .

#### Transmitter Dynamic Testing

2.8 W / 0.6 W / 0.2 W with RNB127, 6 V battery pack; 5.6 W / 0.6 W / 0.2 W at 11 V dc.  
66 dB. Meets FCC requirements for spectral purity for equipment in its power output class and frequency range.  
Squelch off, S9 signal, 42 ms.



well placed and work easily. The speaker mike and dc jack dust covers stayed put when closed, and the radio provides a sturdy metal belt clip. On our review unit, the small plate surrounding the dc jack (it's glued in place) came loose. Otherwise, fit and finish were excellent.

Programming also got high marks from the reviewers. One quirk was the use of the letter **A** in the display to indicate VFO mode. There's no explanation of what **A** stands for. Programming a memory channel involves four steps. After you're done, the H-T automatically returns to VFO mode. Once programmed, the radio was deemed easy to use.

Owing to the H-T's many features and functions, the 56-page manual is larger than most. A *Quick Reference Guide* is printed on heavy card stock, which is helpful. The manual itself contained a few annoying typographical errors, but it's easy to figure out the intent of the words. There is no schematic diagram.

Of special note is the automatic battery saver function. The radio "sleeps" but awakens every 250 ms to check for activity. One reviewer with large hands reported that his pinkie tended to wrap all the way around to the front **MR** button, which activates the memory mode. Those with smaller hands had no such problems. One commented, "I took it out walking each night, and I found it comfortable in hand."

One reviewer found that an incorrect frequency occasionally appeared on the display.

"When working a local repeater, the radio was set to 147.39 on receive and 147.99 on transmit. Sometimes, after transmitting, the display would stay at 147.99, even though it was receiving perfectly fine on 147.39." A low battery could have been the culprit here.

Another reviewer reported that when the radio was in memory mode, he could inadvertently change the memory without realizing it. The Midland 73-030 offers expanded receive coverage right out of the box.

Considering the largely positive impression the unit made on our users, more retailers should seriously consider putting the 73-030 on their shelves. By the way, Midland also makes the larger Model 73-005A, which offers a different variety of features.

**Manufacturer:** Midland Consumer Radio, 1670 North Topping, Kansas City, MO 64120; tel 816-241-8500; fax 816-241-5713. Manufacturer's suggested retail price, \$370.

## STANDARD C156A

Standard has a history of making some small H-Ts. In the past, we've looked at the diminutive C108 2-meter H-T and, more recently, the C508 dualbander. A palm size radio with a tone pad, two knobs on top and three on the side, including a function button, the little C156A is both simple and fun to use and has lots of nice features. This is a very well-built, handsome radio with the excellent fit and finish that Standard owners have come to expect. The only minor gripe in

that regard was that the rubber dust covers over the jacks didn't stay put once they'd been opened. Standard says it's fixed this problem in current production models.

In general, this H-T feels rugged and fits well in the hand. The display panel is easy to read in all but the brightest sunlight. The lamp lights the display but not the keypad buttons.

Audio output was quite good, even at high volume. "There were no distortion, rattles or vibration," one reviewer reported. Transmitted audio quality got mixed reviews from stations the reviewers contacted. Although some noted "clear and strong" reports, several others got "does not sound like your usual voice" and "very low in pitch and a little muffled." One user cured the "muffled" audio by backing away from the mike a bit.

The battery pack, which holds four AA alkaline cells, held up well over the course of our testing. This could vary from one battery brand to another, however.

The radio is a good fit in a shirt or pants pocket, even with the antenna attached. One drawback is the small size of the **Function** button on the side. Considering that it's used fairly often, users felt that a larger button would have been more convenient. There were some complaints about the lack of a squelch knob—but the C156A has an automatic squelch system, so the control is superfluous. There is a **MONitor** button, however.

Ease of programming this radio got mixed reviews. One experienced H-T user called it

### Standard C156A, serial number 66U020176

#### Manufacturer's Specifications

Frequency coverage: Receive and transmit, 144-148 MHz.

Power requirements: 4.0-15 V dc.

Receive,  $\approx$ 30 mA; transmit (max, high power),  $\approx$ 1.3 A at 13.8 V dc.

Size (HWD): 5 $\times$ 2.1 $\times$ 1 in; weight 10.6 oz.

#### Receiver

FM sensitivity, 12 dB SINAD: 0.16  $\mu$ V.

Two-tone, third-order dynamic range: Not specified.

Adjacent channel rejection: Not specified.

First IF and image rejection: Not specified.

Squelch sensitivity: 0.10  $\mu$ V

S-meter sensitivity: Not specified.

Audio output: 250 mW at 10% THD into 8  $\Omega$ .

#### Transmitter

Power output (H/M/L): 1.8 W / 0.35 W with CBT156, 6 V battery tray; 5 W / 2.5 W / 0.35 W at 13.8 V dc.

Spurious signal and harmonic suppression: 60 dB.

Transmit-receive turn-around time (PTT release to 50% of full audio output): Not specified.

Receive-transmit turn-around time ("tx delay"): 76 ms. Not specified.

Note: All dynamic range measurements were made at the ARRL Lab standard spacing of 20 kHz.

\*Measurement was noise-limited at the value shown.

#### Measured in the ARRL Lab

Receive, 100-196 MHz; with reduced sensitivity below 137 MHz and above 174 MHz; transmit, as specified. As specified.

#### Receiver Dynamic Testing

For 12 dB SINAD: 0.13  $\mu$ V. 20 kHz offset, 59 dB;\* 10 MHz offset, 66 dB.

58 dB.

IF rejection, 89 dB, image rejection, 66 dB.

At threshold, 0.09  $\mu$ V.

S9=2.8  $\mu$ V.

281 mW at 10% THD into 8  $\Omega$ .

#### Transmitter Dynamic Testing

1.8 W / N/A / 0.4 W with CBT156, 6 V battery tray; 5.0 W / 2.2 W / 0.4 W at 13.8 V dc.

65 dB. Meets FCC requirements for spectral purity for equipment in its power output class and frequency range.

Squelch off, S9 signal, 27 ms.



"worse than average." Most agreed it was no better than average and they needed to refer frequently to the manual. "Much use of the function button," another user remarked. To program a frequency into memory involves four steps. Switching between memory and VFO mode is easy—the large **V/M ENT** button on the front panel toggles between them.

This is the only unit in the group that has memory naming—and it has the most memories to name, too. You can apply up to seven character names or titles to the unit's 100 memory channels.

The well-organized manual covers 80 pages and includes an index. A couple of experienced H-T users felt it lacked some necessary details (such as information about extended receive coverage), however, and one lambasted the awkward translated English. The first section covers Basic Operations, and the remainder Advanced Operations. "This one tells how to get into a function and how to get out of it," one reviewer commented. Another reviewer became puzzled at first by the musical tones at the end of some transmissions; it turned out to be a low-battery indicator that's undocumented in the manual. The manual includes a troubleshooting section. Illustrations are large enough to show necessary detail. There is no separate quick reference guide or schematic diagram.

This radio seems rugged enough to stand up to repeated use, and our reviewers really appreciated the size and feel of this H-T.

**Manufacturer:** Standard Amateur Radio Products, Box 48480, Niles, IL 60714; tel 773-763-0081; fax 773-763-3377; <http://www.stdradio.com>. Manufacturer's suggested retail price, \$289.

## Summary

If I had to provide one piece of advice based on a close look at these seven H-Ts, it would be this: Don't be seduced by the number of features and functions a particular model offers. Instead, look at the capabilities of each model, and decide which has the features you're likely to use. More bells and whistles *do not* necessarily equate to more operating enjoyment if you don't use them!

A couple of comments are worth noting here. Except for the Kenwood TH-235A, there was nothing in the manuals about using these radios for packet operation. And there's nothing on the boxes—or even in the manuals in most cases—about ham radio! The radios are described as "VHF FM transceivers," or some variant thereof, but there is no indication that they are to be used in the Amateur Radio Service, or that a license is required to transmit on the ham bands.

Overall, these radios represent a terrific cross-section of features and operating convenience, and at a cost that won't bust your budget. Some manufacturers have clearly succeeded better than others, but these seven H-Ts, each with its own personality, are marvels of engineering and electronics. While I was using these radios, I found that

I didn't miss my old, heavy and very, very basic H-T. In fact, I'm not even sure where I put it. I may just have to replace it...

## SOLICITATION FOR PRODUCT REVIEW EQUIPMENT BIDS

[In order to present the most objective reviews, ARRL purchases equipment off the shelf from dealers. ARRL receives no remuneration from anyone involved with the sale or manufacture of items presented in the Product Review or New Products columns.—Ed.]

The ARRL-purchased Product Review equipment listed below is for sale to the highest bidder. Prices quoted are minimum acceptable bids, and are discounted from the purchase prices. All equipment is sold without warranty.

Drake TR270 2-meter transceiver with TNC270, (see "Product Review," Nov 1997 *QST*). Minimum bid: \$825.

ICOM-IC-756 MF/HF/VHF transceiver with narrow CW filters, (see "Product Review," May 1997 *QST*). Minimum bid: \$1683.

SSB Electronic LT2S Mk II 2-meter transverter, (see "Product Review," Nov 1997 *QST*). Minimum bid: \$587.

Ten-Tec OMNI VI Plus MF/HF trans-

ceiver with 500-Hz CW filters, (see "Product Review," Nov 1997 *QST*). Minimum bid: \$1954.

Sealed bids must be submitted by mail and must be postmarked on or before January 1, 1998. Bids postmarked after the closing date will not be considered. Bids will be opened seven days after the closing postmark date. In the case of equal high bids, the high bid bearing the earliest postmark will be declared the successful bidder.

In your bid, clearly identify the item you are bidding on, using the manufacturer's name and model number, or other identification number, if specified. Each item requires a separate bid and envelope. Shipping charges will be paid by ARRL. Please include a daytime telephone number. The successful bidder will be advised by telephone with a confirmation by mail. No other notifications will be made, and no information will be given to anyone other than successful bidders regarding final price or identity of the successful bidder. If you include a self-addressed, stamped postcard with your bid and you are not the high bidder on that item, we will return the postcard to you when the unit has been shipped to the successful bidder.

Please send bids to Bob Boucher, Product Review Bids, ARRL, 225 Main St, Newington, CT 06111-1494.

**QST**

## New Products

### EXTREME-DUTY SURGE PROTECTORS FROM ELECTRONIC SPECIALISTS

◊ Electronic Specialists' new line of extreme-duty surge protectors is designed for 125, 250 and 125/250-V power systems with 15, 20 and 30-A loads. Installed between the power line and the load, the new protection units incorporate heavy-duty



surge fusing to further reduce the risk of damage to connected equipment.

Protection capabilities range from 136,500 surge amps (15-A device) to 253,500 surge amps (30-A device). All models incorporate 1 picosecond suppression to protect against sub-nanosecond spikes.

Prices start at \$135. For more information, contact Electronic Specialists at 171 S Main St, Natick, MA 01760; tel 800-225-4876, fax 508-653-0268, e-mail [clipprr@ix.netcom.com](mailto:clipprr@ix.netcom.com); <http://www.electspec.com>.

### CODE QUICK 2000 ON CD-ROM

◊ New from Wheeler Applied Research is the CD-ROM version of *Code Quick 2000*, a Windows 95-compatible program that uses sounds, cartoons and icons to help students learn Morse code.

Features include calibrated 2-23 WPM Morse code characters sent through your PC's internal speaker or sound card; a detailed user guide and help file; 999 practice QSOs; 999 VE-type practice exams; and a complete set of Novice through Extra-class theory questions.

Price: \$39.95 prepaid (\$34.95 via the internet). Upgrade and bundle pricing is available. For more information, contact Wheeler Applied Research at 800-782-4869; <http://www.codequick.com>.

**QST**

Edited by **Bob Schetgen, KU7G** • Senior Assistant Technical Editor

## REWINDING RELAYS FOR 12 V OPERATION

[In recent months, there have been some great changes in the League's experimenter's publication, *QEX*. Rudy Severns, N6LF, is the new Editor, and I have assumed the Managing Editor duties. We are widening the scope of the magazine considerably. While *QEX* will still carry cutting-edge material in several areas of Amateur Radio, you'll find other articles from a wide range of technical topics at various levels. If you like to build, or read about building, join up!]

As an example of the good stuff in *QEX*, the following hint was a sidebar in Paul Wade's 5760 MHz transverter article in the November 1997 *QEX*. Other hints have presented seat-of-the-pants solutions to adapt various relays for 12-V operation, but this treatment casts aside experimental tactics in favor of an engineering approach.—Ed.]

◊ Microwave operation from high places requires portable operation for most of us. The most convenient power source is usually the 12 V battery in the vehicle that gets us there, and modern solid-state devices work fine at 12 V, or less. Most surplus coax relays, however, are designed for operation at 28 V or more and don't switch reliably at 12 V. When available, 12 V coax relays are exorbitantly priced; so it would be nice if the higher-voltage relays could be converted. Since relays are ancient technology, digging through some ancient issues of *QST* yielded an article<sup>1</sup> that detailed the calculations necessary to rewind relays for different voltages. I will summarize them here because the back issue is probably no longer available.

Ham folklore says it is only necessary to remove turns from the coil until it works at 12 V. I'm told this often works for 28 V relays, but let's go through the numbers and see how well.

## Calculations

The relative force generated by the coil to close a relay is conveniently measured in ampere-turns, simply the current through the coil times the number of turns. If we are rewinding a relay, rather than count thousands of turns, we can simply fill the bobbin with wire and assume that the volume of wire is constant.

Using this assumption and standard US

wire gauge (AWG) sizes simplifies the equations. The AWG wire diameters decrease geometrically with increasing AWG number, so that each size is approximately 1.12 times (or  $10^{0.05}$ ) smaller than the preceding size. Using this relationship, we can calculate the number of turns per square inch,  $N$ , of bobbin cross section changes by a factor of  $10^{0.1}$ , or 1.26, per wire size, and the resistance,  $R$ , per cubic inch of winding changes by a factor of  $10^{0.2}$ , or 1.59, per wire size.

Since we are rewinding the same bobbin, area and volume are constant ( $k$ ), so

$$N^2/R = k$$

Multiplying by  $I^2/I^2$ , this becomes:

$$(NI)^2 / I^2 R = k$$

we can recognize  $NI$  as ampere-turns and  $I^2 R$  as watts, or power.

This means that—for any wire size that fills the bobbin—the same amount of power applied provides the same number of ampere-turns. So, we need to calculate the wire size that will draw the same power at the desired voltage:

$$V_1^2 / R = V_2^2 / R$$

If  $V_1$  is the original (higher) voltage and  $V_2$  is 12 V, then we must increase the wire diameter by:

$$\text{number of wire sizes} = 10 \log(V_1 / V_2)$$

Remember that a larger diameter wire has a smaller AWG number. The original article had a graph, but we can easily solve this on a pocket calculator, *which they didn't have in 1956*. I've summarized the most common voltages in the following table:

### Common Relay Voltages

Original      Desired      # of wire sizes

28 V	12 V	4
48 V	12 V	6
115 V	12 V	10

## Procedure

The rewinding procedure is straightforward: Peel the old wire off the bobbin, measure the wire size and rewind it with larger magnet wire as calculated above. Radio Shack carries several sizes of magnet wire, which may include the one you need. Mechanical details should be much like the original relay; take notes during disassembly. The most difficult part is often prying the bobbin off the metal pole.

Relays in sealed cans are a larger problem, and I welcome suggestions.

The fastest way to wind the new coil is to wrap masking tape around a dowel or pencil until the bobbin fits snugly over it. Then chuck the pencil (with the bobbin) in a variable-speed drill or lathe and run it *slowly* to wind the wire on. At *low* speeds, it's safe to guide the wire with your fingers.

## Example

I found several excellent coax relays with N-connectors at a hamfest, quite cheap because they required 48 V. They were wound with #38 AWG wire. From the equation, converting from 48 to 12 V requires wire roughly six gauges larger, so I rewound one with #32 AWG wire. The original winding required 48 V at 54 mA, pulled in at 35 V and released at 15 V. After rewinding, it draws 265 mA at 12 V, pulls in at 8.5 V, and releases around 2 V. The power consumed is slightly higher now, because six wire sizes is an approximation, but I can be sure it will still operate on a low battery. My 903 MHz station now runs entirely on 12 V.

The SMA relay in my transverter was an easy one to rewind. Two screws secure the cover, and the bobbin is easily removable. The 28 V coil held pretty fine wire—I measured the diameter, guessed the enamel thickness, and estimated the wire size as #42 AWG. From the table above, the new wire should be four wire sizes larger, or #38 AWG. I rewound the coil with #38, reassembled it and tested it. The relay now switches solidly at 11 V. A better choice might be #36 AWG wire, which would give a little more voltage margin for low-battery operation, but I don't have any in the junk box. Incidentally, this relay has an unusual construction that will not operate with the coil voltage reversed, so try it both ways to find the right polarity.

## Alternative

As mentioned previously, we could have just removed turns to increase the current until the relay draws the same power at the lower voltage. If we remove half the turns, the resistance drops to half. The original resistance of the 48 V relay is  $48 \text{ V} / 54 \text{ mA} = 888 \Omega$ . At 12 V, we need 216 mA for the same power, or a new resistance of  $55 \Omega$ , so we need one-sixteenth as many turns. We increased the current four times, so we end up with one-quarter as many ampere-turns as the original, or only one quarter as much

<sup>1</sup>L. B. Stein, Jr, W1BIY, "Some Hints on Relay Operation," *QST*, Jun 1956, pp 21-25.

force pulling in the relay. If we weaken the spring enough, it may work, but will it be reliable?

A few more trials convinced me that no matter how many turns of the original wire are removed from a 48 V relay, the force pulling it in at 12 V will only be 25% of that at 48 V. A 28 V relay isn't as bad—the force is only reduced by 12/28, to a bit less than half the original force. There is probably a combination of turns and spring bending that will work, but if you've done enough disassembly to remove turns, why not take the rest off and rewind it for 12 V?

## International

I haven't tried modifying any relays from other countries, but it wouldn't surprise me if they use other wire-sizing systems. In the UK, they may still use SWG sizes, which differ from AWG, but the relative sizes are close enough so that increasing the diameter by the number of sizes calculated above should work. So measure the wire, convert to the nearest AWG or SWG size, and go from there. I don't know what metric standard wire is available. (The Component Data chapter of the *ARRL Handbook*<sup>2</sup> contains a "Copper Wire Specifications" table that lists AWG specifications with the nearest equivalent SWG.—Ed.)

## Conclusion

Rewinding a surplus coax relay for 12 V operation requires only one simple calculation and perhaps an hour of work; why not try it rather than pay exorbitant prices or use inefficient dc-dc voltage converters? —Paul Wade, N1BWT, 161 Center Rd, Shirley, MA 01464; e-mail [n1bwt@qsl.net](mailto:n1bwt@qsl.net)

## PAINT SPRAY HEADS AS KNOBS

◊ I needed a replacement knob for the TONE rotary switch on my Heathkit HW-2036A 2 meter FM transceiver. My father keeps many old things in his large garage. Among them is a one-pound coffee can full of self-propellant spray-can controls (buttons). It took about 10 minutes to find one that would friction fit over the narrow diameter shaft of the switch. Key points of this replacement knob are:

- It is very close to being the same size as the original knob.
- It is knurled.
- The knob is black with the white nozzle section, which acts as a pointer.
- The knob end (spray can control top)

<sup>2</sup>The 1998 *ARRL Handbook* is Order No. 1743. ARRL publications are available from your local ARRL dealer or directly from ARRL. Mail orders to Pub Sales Dept, ARRL, 225 Main St, Newington, CT 06111-1494. You can call us toll-free at tel 888-277-5289; fax your order to 860-594-0303; or send e-mail to [pubsales@arrl.org](mailto:pubsales@arrl.org). Check out the full ARRL publications line on the World Wide Web at <http://www.arrl.org/catalog>.

has an arrow indented in it that points in the same direction as the white nozzle section.

- Total out of pocket cost is nil.

I have been using this "knob" since 1989.—ARRL Technical Specialist Lawrence W. Joy, WN8P, 2116 E Mohawk Dr, Olathe, KS 66062-2432

## A GOOD SIDETONE OSCILLATOR

◊ I've generally found that a good sidetone oscillator is difficult to find. One common approach is to build an audio multivibrator—and that does produce an acceptable sidetone. Unfortunately, it produces a square wave, and my attempts to eliminate clicks have all produced an unacceptable chirp. Other approaches I've tried also have one or more undesirable characteristics: chirp, square-wave output or no shaping of the keyed waveform. This oscillator is different. It has shaped keying, no chirp and a sine-wave output.

The basic circuit is a phase-shift oscillator with an RC network supplying the necessary 180° phase shift between the collector and base. In order for the oscillator to work, it must have enough gain to more than overcome the losses in the phase-shift network. We can, therefore, manipulate the gain to start and stop oscillation. By shifting the gain just above and below the critical point, I can shape the envelope. Since this happens without keying any of the dc paths, there are no clicks.

R2 provides emitter degeneration and makes the circuit relatively device independent. With the key down, R3 is ac bypassed, the gain of the amplifier is predominantly determined by the ratio R1 / R2, and the oscillator will run. R2 is chosen such that the oscillator will not start "full on," but rather will ramp up nicely. Smaller values

of R2 produce harder keying. R2 also very helpfully provides a large base input resistance, so that the transistor does not load the feedback network.

With the key released, R1 / (R2 + R3) would determine the gain, if it were not for R4 and C1. Chose R1, R2 and R3 so that the amplifier gain is approximately 1 with the key up, and no oscillation is possible. However, R4 and C1 provide shaping of the envelope "tail." Simply adjust R4 a bit past the point where oscillation ceases with the key up, and it will be about right.

With the values shown, the circuit draws very little current, and delivers a sine-wave output with a nicely shaped envelope. With a 12 V supply, the output is about 5 V (P-P) and keying is good over the 12 to 13.5 V operating range.

There are a couple of minor bugs: The output impedance is about 10 kΩ, so the circuit requires a high-input-impedance buffer. Also, the circuit loses about three dots when you first switch it on. Since the oscillator draws so little power, I just leave it on always.—Denton Bramwell, K7OWJ, 2853 E Country Oaks Dr, Layton, UT 84040; e-mail [denton@cyber-west.com](mailto:denton@cyber-west.com)

Hints and Kinks items have not been tested by *QST* or ARRL unless otherwise stated. Although we can't guarantee that a given hint will work for your situation, we make every effort to screen out harmful information. Send technical questions directly to the hint's author.

*QST* invites you to share your hints with fellow hams. Send them to "Attn: Hints and Kinks" at ARRL Headquarters (see page 10), or via e-mail to [rschettgen@arrl.org](mailto:rschettgen@arrl.org). Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing an item, please send the author(s) a copy of your comments.

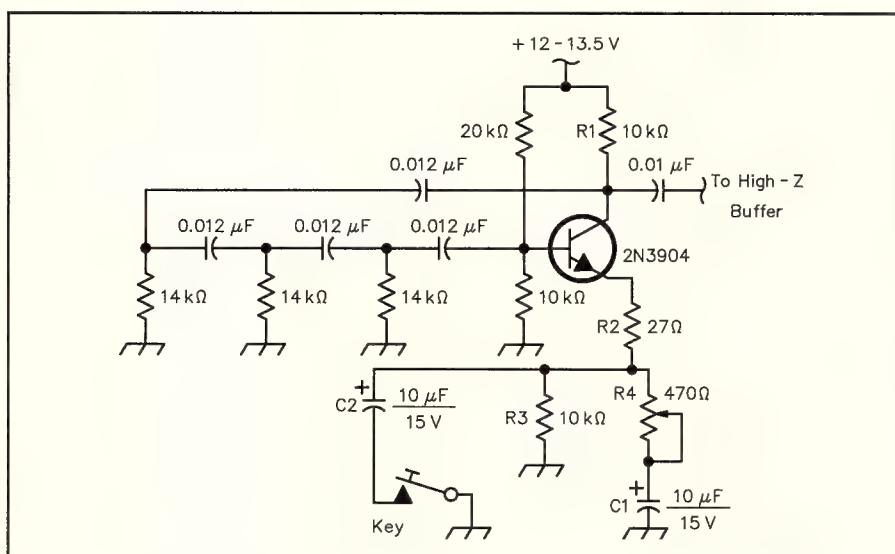


Figure 1—K7OWJ's sidetone oscillator. Use  $1/4\ \Omega$ , 5% tolerance resistors, and ceramic disc capacitors except for C1 and C2, which are electrolytics. Equivalent parts may be substituted.

# Technical Correspondence

Edited by **Paul Pagel, N1FB** • Associate Technical Editor

## WHICH SOLAR ACTIVITY MEASUREMENT SHOULD I USE?

By **R. Carl Luetzelschwab, K9LA, 1227 Pion Rd, Fort Wayne, IN 46845**

◊ Saturday—My weekly DX bulletin just arrived in the early morning mail, and it says the HKØ operation is supposed to be on around 1600 UTC. Let's see...that's 11 AM here, so I'd better get in gear. I need HKØ on 12 meters for DXCC! So I'll listen to WWV to see what the numbers are. Then I can run a quick propagation prediction to see if I'll have a chance on 12 meters today... It's just coming around to 18 minutes past the hour...I'm in luck—I won't have to listen to WWV for long.

Okay, not bad. The K index is 2, and the solar flux is 169. Let's put that solar flux into my propagation prediction program and see what the MUF is around 1600 UTC. Well, shoot! It says the MUF is only 22.7 MHz. That's not enough for 12 meters! No use wasting my time today. Besides, I have things to do around the house.

Sunday—Well, yesterday wasn't too good. Maybe today will be better for the HKØ on 12 meters. Let me check Packet, too, to see what's happening. Whoa! What's this? One of the locals spotted the HKØ operation on 12 meters yesterday—and comments that they had a good signal! I bet he worked them, too! Darn! That ticks me off! My propagation prediction program screwed up! I'm going to call those guys tomorrow and tell them their program isn't very good, then I'll buy a better one.

Does this scenario sound familiar? What happened? Did the propagation program really screw up? Let's take a deeper look at this. We'll learn some interesting things along the way—ultimately we'll see why it's best to *not* use *daily* solar flux for propagation prediction programs.

To start with, the ionosphere varies quite a bit day-to-day. This is seen in Figure 1, which shows typical observed F region critical frequencies (foF2) for each day at the same hour during a one month period (the specific hour is 1600 UTC, and the month/year is December 1980). It indeed bounces around a bit every day (even at the same hour). If we throw out the data on the 20th and 21st because of some magnetic field storminess, it still says foF2 varied from a low of 6.2 MHz to a high of 8.9 MHz at the same hour each day of the month.

Remembering that the F region MUF is approximately three times the F region

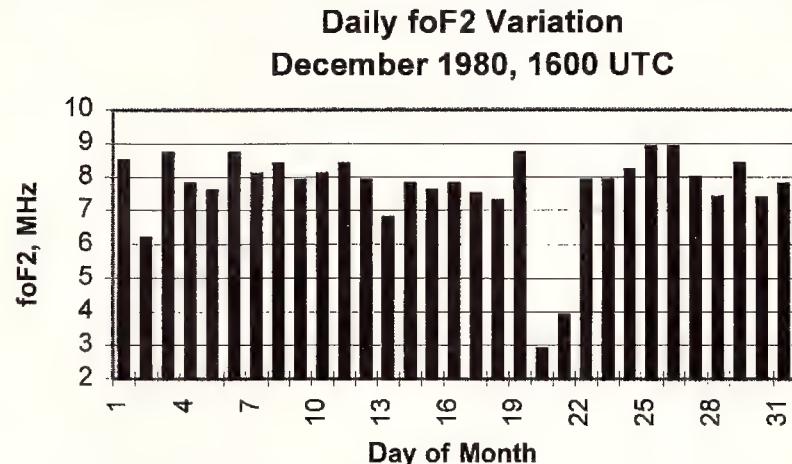


Figure 1—Daily foF2 variation.

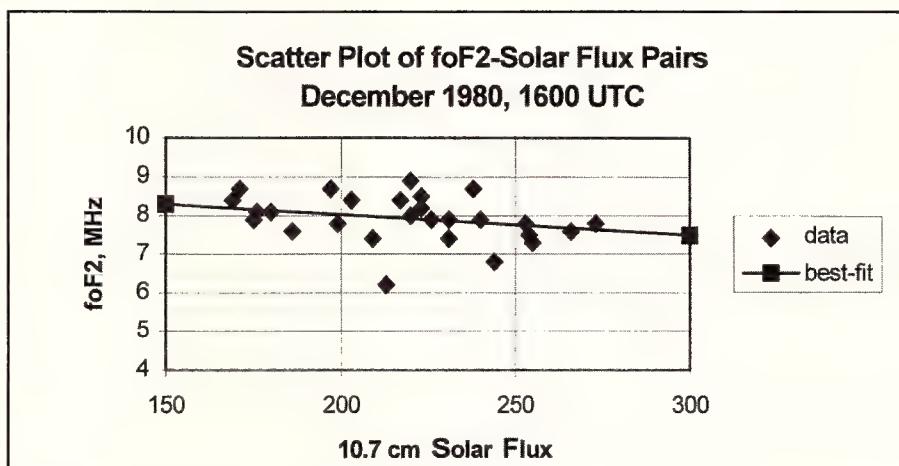


Figure 2—Scatter plot of foF2-solar flux pairs.

critical frequency (I used 3.15 for my calculations—this corresponds to an F region peak at about 300 km and an elevation angle of about 7°) says the observed F region MUF at 1600 UTC was anywhere from 19.5 MHz (the 17 meter band) to 28.0 MHz (the 10 meter band), depending on the day chosen. Yes, that's a lot of day-to-day variation. No problem, though. As long as the daily critical frequency correlates to the daily solar flux, we're okay.

Right off, an alarm bell should sound. Solar flux is measured *only once per day*, so trying to correlate it to a specific hour in the day may be a problem. But let's see what happens anyway.

Figure 2 is a scatter plot of each day's

data at 1600 UTC during December 1980 (with the 20th and 21st thrown out as discussed earlier). Each plotted point represents an foF2-solar flux pair at 1600 UTC. There's also a best-fit straight line drawn (compliments of the graphing software) to show what the correlation is, if any.

What the best-fit straight line indicates is that as solar flux increases, foF2 decreases. But that's a contradiction to what we know really happens. What's wrong here? It really says that there *isn't* a good correlation between daily foF2 and daily solar flux! The true underlying problem is that the solar flux at 10.7 cm is not the ionizing energy.

If that's true, how do propagation pre-

diction programs work? This daily variation was recognized early on, and resulted in looking for a much better correlation between some aspect of the critical frequency and some aspect of the solar flux. The answer was to use the *monthly median critical frequency* and the *smoothed* (12-month running average) solar flux.

To illustrate this concept, the median critical frequency of the observed data in Figure 1 is 7.9 MHz. Using the lowest solar flux observed in December 1980 (169 on the 8th of the month) in a propagation prediction program would give a predicted median MUF of 22.7 MHz—about 9% too low. This is what caused the specific problem in the scenario at the start of this discussion.

Using the highest solar flux observed in December 1980 (273 observed on the 16th) would give a predicted median MUF of 29.4 MHz—about 18% too high. That's not good, either—it would be overly optimistic in predicting an opening. Finally, using the smoothed solar flux for December 1980 (196) would give a predicted median MUF of 24.9 MHz that is equal to the observed median MUF. That's what we want.

So it wasn't the propagation prediction program's fault in the opening story—it was the use of the improper value of solar activity. Thus, for best accuracy in propagation predictions, use the smoothed solar flux (or smoothed sunspot number). That's how the model of the ionosphere was developed. Using the daily solar flux will significantly compromise the prediction accuracy.

## CHRYSLER RESPONDS

By Bill Gilmore, WB8FPQ, EMC Tech Club, Product Engineer, Chassis/Drivetrain Electronics Group, Truck Platform Electrical/Electronics Engineering, Plymouth Road Office Center, Chrysler Corporation, CIMS 514-1660, PO Box 33514, Detroit, MI 48227-3086

In response to the reply to Art, N8BLK, in the "The Doctor is IN,"<sup>1</sup> we would like to offer the following explanation of our position. Chrysler is specific in its recommendation to connect the radio negative power lead to *body sheet metal* at the radio or to *body sheet metal* at the battery connection, *not* at the battery. This is a very important point that has been missed in the response.

If the negative connection is made at the body where the battery is bonded, it will not cause the effects described in the response. If the battery negative lead opens, the vehicle running load as supplied by the alternator is safely returned to the alternator negative at the engine block. If the vehicle is off, it cannot draw starter current through *any* path, ensuring a safe condition for all wiring and accessories.

As confirmation of this technique, note that all of the load devices in the entire vehicle, as supplied by the OEMs, (including brands F and G) are connected in this fashion.

It is a mystery to us why Japanese radio manufacturers insist on supplying wiring kits with the negative lead fused, unless it is to accommodate positive ground vehicles (certain classic British cars and some older brands of medium and heavy trucks and construction equipment). Even this is not possible where the dc and RF grounds in the radio are not isolated for dc.

The hazard that is described with the negative lead fused and connected at the battery, is if the negative fuse opens (one or the other will open first on an overload, or sometimes for no reason: a 50/50 chance), all of the radio current will seek an alternate path to battery negative. If the radio chassis is

<sup>1</sup>The response to the question posed by Art Clemons, N8BLK, "The Doctor is IN," QST, Aug 1997, p 50.

securely connected to body sheet metal (hard to guarantee in today's vehicles, with high content of structural thermoplastics), this is probably not a problem. If the only connection is through the coax shield to the antenna base, a high power radio will probably cause some local heating at the highest resistance point, possibly at the antenna base.

Again, note that fusing only the positive supply is the standard practice of the manufacturers of commercial two-way transceivers, as well as other add-on accessories.

[Several automobile manufacturers, including Chrysler, have developed printed guidelines to assist those customers who want to install transceivers in their cars. It is important that each manufacturer's guidelines be followed carefully. This will help ensure that both the installed equipment and the automobile work as designed. Most manufacturers will only support customers who follow their guidelines exactly.—Ed Hare, W1RFI]

Letters for this column may be sent to Technical Correspondence, ARRL, 225 Main St, Newington, CT 06111, or via e-mail to [ppagel@arrl.org](mailto:ppagel@arrl.org). Please include your name, call sign, complete mailing address, daytime telephone number and e-mail address on all correspondence. Whether praising or criticizing a work, please send the author(s) a copy of your comments. The publishers of QST assume no responsibility for statements made herein by correspondents.



◊ There was an error in the description of one of the photos that appeared on our November 1997 Field Day cover. Bob Melvin, WT1O, is instructing Dakota Whitaker at the combined Barnstable ARC and Sandwich ARC site on the Cape Cod Canal, not at the Framingham ARA location. **QST**

39759; tel 800-647-1800; fax 601-323-6551; <http://www.mfjenterprises.com>.

## POWER SUPPLY UPGRADE KIT FOR COLLINS 30L-1 AMPLIFIERS

◊ Designed to restore your 30L-1 amplifier to full output power (900 W key down), Steve Pautard, WN4I, is offering a power supply upgrade kit that requires only seven wires and a few screws. The updated circuit board features eight 1-kV, 3-A diodes and six 140  $\mu$ F, 450-V computer-grade filter capacitors. The new circuit provides more current for modulation peaks and lets the power transformer run cooler.

Price: Ready to install, \$122 plus S&H; Installed by me, \$132 plus UPS shipping for your amplifier. For more information, contact Steve Pautard, WN4I, 5833 Dryden Rd, West Palm Beach, FL 33415; tel 561-689-8819.

the MFJ-281 is available from your local Amateur Radio dealer or by contacting MFJ,

300 Industrial Park Rd, Starkville, MS



## THE CLEARTONE COMMUNICATIONS SPEAKER FROM MFJ

◊ Designed to improve the intelligibility of SSB, FM, AM and CW signals in the 600 to 4000 Hz range, MFJ's Model 281 ClearTone Communications Speaker reduces noise, static and hum. The 3.75 x 3 x 2.25 inch unit features a high-grade, 3-inch Mylar cone speaker mounted in a special baffle and covered with a fine mesh grille. A swivel bracket lets users direct sound where it's needed. The 8- $\Omega$  speaker can handle up to 8 W of audio power.

Price: \$9.95. Backed by MFJ's "no matter what" unconditional one-year warranty,

Edited by **Rick Lindquist, N1RL** • Senior Assistant Technical Editor

## FCC Opens Vanity Gate 4!

The FCC has announced that vanity call sign Gate 4—the last vanity gate—will open December 2, 1997, for General, Tech Plus, Technician and Novice class hams to request a vanity call sign.

Applicants may use either the electronic Forms 610V and 159 on the Web or hard-copy Form 610V and 159—but not both. Both versions—plus fact sheets and answers to frequently asked questions—are available at <http://www.fcc.gov/wtb/amateur>. The application fee is \$50, payable by check (to "FCC"), bank draft, money order or credit card. Do *not* send cash. The FCC gives processing priority to electronically filed Forms 610V for which the filing fee and Form 159 have been received.

It's up to applicants to make sure that their applications do not arrive before December 2, 1997. The FCC will return all applications that arrive early.

Any call sign requested must be appropriate for your license class. Technician, Tech Plus, and General class licensees may ask for a Group C (1x3) or D (2x3) call sign. Novice class licensees may request only Group D call signs.

Electronic filers must mail the Form 159 Fee Remittance Advice to: FCC, Amateur Vanity, PO Box 358994, Pittsburgh, PA 15251-5994. The Form 159 and the fee must be received within 10 days of electronically filing your Form 610V or your application will be dismissed.

Those filing on document forms must mail the application package containing a completed Form 610V with a copy of your license attached, Form 159, and the proper fee in a sealed envelope to: FCC, Amateur Vanity, PO Box 358924, Pittsburgh, PA 15251-5924.

Application packages via courier or delivered by hand must be prepared in the same way, sealed in a second, outer envelope, and addressed to: Federal Communications Commission, c/o Mellon Bank, 525 William Penn Way, 27th Floor, Room 153-2713, Pittsburgh, PA 15259, ATTN: Wholesale Lockbox Shift Supervisor.

For general information, call the FCC's toll-free National Call Center, 888-225-5322 (CALLFCC).

### Amateur Radio Legend Doug DeMaw, W1FB, SK

Acclaimed ham radio icon Milton F. "Doug" DeMaw, W1FB, died September 28. He was 71. One of the most widely published technical writers in Amateur Radio, DeMaw was diagnosed with leukemia earlier this year and had been in failing health.

DeMaw was first licensed in 1950 as W8HHS. He later became W1CER. An electrical engineer, he was a member of the ARRL Headquarters staff for 18 years—from 1965 to 1983—and served as Technical Department Manager and Senior Technical Editor from 1970 to 1983. (His wife, Jean, W1CKK, also worked on the Headquarters staff.) During his tenure at HQ, DeMaw served as editor of *The ARRL Handbook*. In 1970, he engineered the shift in emphasis toward solid-state design in *QST* and the *Handbook*. He wrote hundreds of articles for *QST* and other publications. DeMaw also was founder and publisher of *VHFer Magazine*. DeMaw was a life member of the ARRL, a senior member of the IEEE, and a member of the QRP Hall of Fame.

After retiring to the family farm in Luther, Michigan, he was elected chairman of the Lake County Board of Commissioners and continued to write books and articles. He also tried his hand in the Amateur Radio business as proprietor of Oak Hills Research. Among his other books, DeMaw wrote *W1FB's Design Notebook*, *W1FB's QRP Notebook*, *W1FB's Antenna Notebook*, and *The ARRL Electronics Data Book*, which remain popular. In recent years, DeMaw also penned regular columns for *CQ* magazine and *Monitoring Times*.

At its October 11 meeting, the ARRL Executive Committee recommended to the Board of Directors that the Technical Excellence Award be renamed the Doug DeMaw Technical Excellence Award, as requested by several members who have earned this award.

A former ARRL colleague, Membership Services Manager Chuck Hutchinson, K8CH, counted DeMaw among his friends. "Doug loved to experiment with circuits and antennas. He also loved to encourage others to try their hand at building," he recalled. Hutchinson said DeMaw not only wrote prolifically about ham radio but also about gardening, another of his avocations. "He was an avid gardener and cook," he said. DeMaw also was an outdoorsman and hunter. "He loved to hunt with bow and rifle—both modern and muzzle loader. He was very good at throwing a knife or hatchet," Hutchinson said.

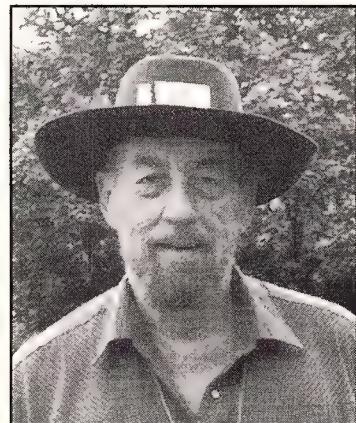
HQ staff member Paul Pagel, N1FB, also was one DeMaw's colleagues during his days at ARRL HQ. "Amateur Radio benefited greatly from his work," Pagel said. "He was a multifaceted man. I doubt there was anything he couldn't do if he set his mind to it." Retired HQ staffer Jerry Hall, K1TD, who also worked with DeMaw during his years at the League, called DeMaw a writer of "uncanny" ability. "Doug could write it once, and it was done," he recalled.

Another former HQ staffer, Gerry Hull, W1VE/VE1RM, called DeMaw an important career influence. "He was always there when I was stuck with a tough technical challenge," he said.

Jim Jones, K5GSH, of Albuquerque, New Mexico, called DeMaw's death "a personal loss." Jones recalled how, as a young ham, he had problems getting one of his first transmitters to work. He called the ARRL and DeMaw talked him through the circuit and helped him to uncover the problem. "I remember thanking Mr. DeMaw. He plainly told me that hams are friendly folk and always share what they know."

Forrest Plumstead, WB5HQO, of Ft Richardson, Arkansas, expressed similar sentiments. "He, more than anyone else I can think of, encouraged me to build my own equipment," he said. "The world of ham radio has lost one of its giants."

In addition to his wife, survivors include their son, David, N8HLE, a technical writer who lives in Connecticut. Memorial contributions may be made to Luther Historical Museum, c/o Luther State Bank, Box 39, Luther, MI 49656.



CHUCK HUTCHINSON, K8CH

# FCC Issues New Form 610—Old Versions Obsolete

The FCC has announced that as of January 1, 1998, Amateur Radio applicants may only submit FCC Forms 610, 610A and 610B that carry an edition date of September 1997. After the first of the new year, previous editions of Form 610 will *not* be accepted for filing by the FCC or by Volunteer Examiner Coordinators (VECs). Amateurs may begin using the new Forms 610 now.

The major change on the new form is a certification that says the applicant has "read and will comply with Section 97.13(c) of the Commission's Rules" regarding RF radiation safety and the amateur service section of OET Bulletin No 65, *Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields*. At the time the FCC announced the new form, Amateur Radio Supplement B of Bulletin 65 was still in the draft stages and not yet available to the ham radio community.

ARRL Executive Vice President David Sumner, K1ZZ, said the League was troubled that the new Form 610 could be in the hands of hams before the Amateur Radio supplement became available. "We are very

concerned that a deadline has been set for amateurs to comply with before the information they will need in order to comply has been made available to them," he said.

ARRL Lab Supervisor Ed Hare, W1RFI, who's been involved in reviewing the draft supplement, said he expected the FCC to release it in November. The ARRL will release a book on the new RF safety regulations in the coming months. "Above all, it is important that the required station evaluation be as easy as possible for hams," Hare said. "The FCC has pretty much met that goal—most hams, by virtue of their power levels, will not need to do an evaluation at all."

Section 97.13(c) says that before you transmit "from any place where the operation of the station could cause human exposure to RF electromagnetic field levels in excess of those allowed," you have to perform a routine RF environmental evaluation if your power input to the antenna exceeds these limits: 160-40 meters, 500 W; 30 meters, 425 W (legal limit is 200 W—Ed); 20 meters, 225 W; 17 meters, 125 W; 15 meters, 100 W; 12 meters, 75 W; 10 meters, 50 W; 6, 2, and 1 1/4 meters, 50 W; 70 cm, 70

W; 33 cm 150 W; 23 cm, 200 W; 13 cm, 250 W; SHF/EHF (all bands) 250 W. (The FCC also has set 500 W *ERP* as the power level below which an RF safety evaluation will not be required for most amateur repeater stations.) If the routine environmental evaluation indicates that the RF electromagnetic fields could exceed the maximum permissible exposure limits, you must take action to prevent human exposure.

You can get the new Forms 610 from the FCC's Web site at <http://www.fcc.gov/formpage.html>, at <ftp://ftp.fcc.gov/pub/Forms/> or by fax at 202-418-0177 (request index, or for Form 610 use form code 000610, for Form 610A use form code 006101, for Form 610B use form code 006102). The FCC Forms Distribution Center accepts orders at 800-418-3676. ARRL VEs and VE teams were expected to have a supply of the new Forms 610 by late November.

Individual hams may get a copy of the new Form 610 by sending a self-addressed, stamped envelope (SASE) to ARRL/VEC, 225 Main St, Newington CT 06111. Include 32 cents postage for each Form 610 requested.

## WRC-97 Under Way in Geneva

Ham radio is well represented at the International Telecommunications Union's 1997 World Radiocommunication Conference, which began October 27 in Geneva, Switzerland. WRC-97 is set to wrap up on November 21. ARRL Technical Relations Manager Paul Rinaldo, W4RI, is a member of the US delegation. Others attending include IARU representatives Larry Price, W4RA, Wojciech Nietyksza, SP5FM, and Michael Owen, VK3KI. Jim Dean, VE3IQ, of Radio Amateurs of Canada, and David Wardlaw, VK3ADW, of the Wireless Institute of Australia are on their nations' delegations.

Among many other topics, the so-called "Little LEO" issue will come before the WRC-97 delegates. Current US proposals do not include any plans to share amateur frequencies, but this does not prevent other

countries' delegations from bringing up plans that might adversely affect ham radio allocations. An FCC order to confirm an industry agreement to share existing Little LEO allocations warned the industry not to expect additional spectrum in the future. "We had significant difficulty obtaining spectrum for Little LEO service at WRC-95," the FCC said. However, Little LEO advocates continue their attempts to justify additional allocations.

WRC-97 delegates will set the agenda for WRC-99, which is expected to include two important ham radio topics. One is discussion of a possible exclusive worldwide 40-meter allocation at 6900 to 7200 kHz. Only 7000 to 7100 kHz now are available in Regions 1 and 3, where broadcasters dominate the upper 200 kHz of the band. Another is Article S25 of the international radio regu-



lations. Article S25 covers all aspects of the Amateur Service including the Morse code requirement for operation below 30 MHz.

WRC-97 delegates also will be asked to add the Earth Exploration Satellite service to the 430 to 440 MHz band and to upgrade the status of EES in the 1240 to 1300 MHz band. The issue of wind profiler radar systems—operating at 50, 449 and 1000 MHz and having some potential for interference to Amateur Radio allocations—also is among the WRC-97 topics.

ing. The screen will prompt you with a Fee Remittance Advice, Form 159. The form will indicate that there is no charge to renew an Amateur Radio license (except for vanity call sign holders, who won't have to renew for several more years yet).

Send comments about the FCC Form 900 to [sreed@fcc.gov](mailto:sreed@fcc.gov). For technical assistance, call the FCC Technical Support Group at 202-414-1250.—FCC

## FLORIDA JUDGE THROWS OUT SCANNER CASE AGAINST HAM

A judge in Florida has dismissed a case against Joseph Osborn, KF4HXE, of Plantation, Florida, whose radio gear was con-

### FCC ANNOUNCES ON-LINE RENEWAL FORM 900

The FCC has consolidated eight renewal forms into one on-line form. Called Form 900, Application for Electronic Renewal of Wireless Radio Services Authorizations, this form is an interim measure to permit all FCC Wireless Telecommunications Bureau licensees, including hams, to renew their licenses via the Internet.

This form is *only for renewals*, not for license modifications. You can only enter changes (eg, name, address) using Form 900 as a part of the process of renewing your license. You can only access Form 900 if the expiration date on your license falls

within the renewal window (within 120 days of expiration). You *cannot* use Form 900 to renew an expired license. Form 900 may only be submitted electronically.

Access Form 900 on the WTB Electronic Commerce page, <http://www.fcc.gov/wtb/electcom.html> (click on Production Page for Electronic Commerce Applications to access the Form 900). Once you've entered your call sign and accessed the form, click on any item number for filing instructions. After filing the form, click on Electronic Renewal Query. This lets you view or print the information submitted.

Click on the Continue button to obtain the fee information pertaining to your fil-

fiscated by police under Florida's "scanner" law earlier this year. Osborn was involved in a minor accident last May and subsequently cited by police in Davie, Florida, allegedly for breaking state law by having radios in his car capable of receiving police frequencies. Although the law specifically exempts hams, Davie police impounded Osborn's equipment anyway because he could not produce his ham ticket—lost during a recent move. Even after Osborn showed Davie police a copy of his license, authorities refused to drop the charges or to return his radios. Osborn later learned that police might have tampered with his equipment, possibly damaging it and voiding warranties.

Alexander L. Kaplan, KF4QBU, of Boca Raton—an ARRL Volunteer Counsel—represented Osborn. John Hennessee, N1KB, of the ARRL Regulatory Information Branch, supplied information on federal preemption.

Broward County Court Judge J. Steven Shutter dismissed the case dismissed in August. Shutter said the state law does not require hams to have their licenses in their possession, as local police had asserted. He also cited federal pre-emption of prosecution of hams under state and local laws that make it illegal to possess scanning radios capable of receiving public safety or emergency frequencies. Florida's law bans such scanners in vehicles and in retail stores, but not in homes.

Shutter ordered Davie police to return Osborn's radio equipment and to provide an affidavit specifying "who, what, when, where and how the radios were examined and what was done to them." Osborn has since recovered his radios.

## ARRL SEEKS CHANGES TO CW WAIVER RULES

The ARRL has asked the FCC to change the way Morse code exam exemptions for severely handicapped applicants are handled. The League wants to change the procedural requirements in Part 97 that must be met, prior to granting examination credit.

Under the League's proposed changes, a candidate at least would have to *attempt* the CW test—with any and all necessary accommodations—before being granted an exam waiver based on a physician's certification. Also, Volunteer Examiner Coordinators (VECs) would be entitled to request medical information pertinent to an applicant's handicap from the certifying physician. VECs also would be required to have this information on file before the application is forwarded to the FCC for processing.

In its petition filed September 23, the League said the two "rather minor changes" are needed to restrict the waiver process to use by severely handicapped individuals "for whom the process was intended in the first place and who deserve the substantive accommodation." The League also said the changes would "stem abuses" of the waiver system without putting unreasonable burdens on examinees.

## FCC SEQUENTIAL CALL SIGN UPDATE

The following is a list of FCC sequentially assigned call signs issued as of October 1, 1997.

District	Group A Extra	Group B Advanced	Group C Tech/Gen	Group D Novice
0	AB0GH	KI0KE	++	KC0CAA
1	AA1SS	KE1IP	N1ZSQ	KB1CFD
2	AB2EH	KG2MP	++	KC2CLQ
3	AA3QI	KF3AJ	N3ZXI	KB3BVI
4	AF4FS	KU4LB	++	KF4UEF
5	AC5NX	KM5MG	++	KD5CIQ
6	AD6DF	KQ6RZ	++	KF6NMB
7	AB7WM	KK7KB	++	KC7ZHD
8	AB8BG	KI8DU	++	KC8IOH
9	AA9UY	KG9LK	++	KB9RLN
N Mariana Island	NH0B	AH0AY	KH0GT	WH0ABI
Guam	++	AH2DE	KH2SL	WH2ANV
Hawaii	AH7V	AH6PD	KH7GU	WH6DEI
American Samoa	AH8P	AH8AH	KH8DK	WH8ABF
Alaska	AL0F	AL7QU	KL0KK	WL7CUM
Virgin Islands	++	KP2CM	NP2JT	WP2AIJ
Puerto Rico	NP3O	KP3BC	NP3RE	WP4NMM

++All call signs in this group have been issued in this district.

The CW waiver system has been in effect for seven years. The League says that experience has shown that many applicants without severe handicaps "have abused the process" by obtaining physicians' certifications of inability to pass the telegraphy examination. At present, 8% of those applying through the ARRL-VEC have requested a medical exemption from the higher-speed code requirement. Another large VEC reports similar experience.

FCC rules requires volunteer examiners

to exercise broad latitude in administering CW exams to accommodate handicapped applicants. Instead, the League observed in its filing, there is "a tendency for applicants to seek exemptions instead" of accommodations.

As of press time, this petition had not been given a rulemaking (RM) number.

## FCC ADMINISTRATIVE LAW JUDGE REAFFIRMS KV4FZ DECISION

An FCC administrative law judge has reaffirmed his decision to not renew the operator and station licenses of Herbert L. Schoenbohm, KV4FZ, of Kingshill, Virgin Islands, but the saga continues. Early last year, FCC Administrative Law Judge Edward Luton determined the Commission should not renew Schoenbohm's ham ticket, but Schoenbohm filed exceptions. The FCC remanded the case to Luton. His supplemental initial decision September 30 contained additional findings of fact and reaffirmed his earlier decision.

Schoenbohm's attorney said he planned to file exceptions to the judge's most recent decision. If that is unsuccessful, he still has a judicial appeal (US Circuit Court of Appeals, District of Columbia) available to him. In the meantime, Schoenbohm may continue to operate.

In late 1992, Schoenbohm, now 57, was found guilty in US District Court of using a "counterfeit access device" to make long-distance telephone calls. While his initial conviction did not specifically involve breaking FCC regulations, Schoenbohm eventually ran directly afoul of the Commission, which said his conviction "is relevant to evaluating the likelihood that he will comply" with the FCC's Amateur Radio rules.

In early 1994, the FCC designated his application to renew his ham radio license for a hearing, but extended the expiration date of the license until the matter could be settled.

Luton concluded after the hearing that

## ROBERT M. MORRIS, W2LV, SK

Inventor, researcher and radio pioneer Bob Morris, W2LV, of Sparta, New Jersey, died October 15. He was 95. Morris was first licensed in 1922 as 2CQZ. He became 2LV (later W2LV) in the late 1920s. Early in his amateur career, Morris' 2CQZ (running a spark gap transmitter) was among the stations heard in Great Britain and in Europe during the ARRL's Third Transatlantic Tests (see *QST*, Feb 1923). He later worked with Edwin H. Armstrong, the man credited with inventing FM.

A noted broadcasting historian and storyteller, Morris appeared in Ken Burns' PBS documentary *Empire of the Air—the Men who Made Radio*. He was a member of the ARRL for 75 years, a founding member of the Antique Wireless Association and of the New Jersey DX Association, and a member of the Sussex County Amateur Radio Club.

Survivors include his wife, Dorothy, a son and daughter, and several grandchildren and great-grandchildren. The family has asked that donations in Bob Morris' memory be made to the Antique Wireless Association, c/o Dexter Deeley, Treasurer, 8 Briar Cir, Rochester, NY 14618.—thanks to Deb McKay, N2TTP

Schoenbohm's 1992 felony conviction plus his subsequent "knowing violation" of the FCC's *ex parte* rules "provides further evidence that the Commission will not be able to rely on him to be truthful or to comply" with FCC rules and policies. Schoenbohm was accused of improperly encouraging other people to intervene on his behalf with the FCC and of using ham radio to do so in at least one instance. The *ex parte* rules prohibit anyone in Schoenbohm's situation from directly soliciting such political intervention without FCC knowledge.

FCC documents show that KV4FZ had a distinguished record of Amateur Radio public-service and had helped provide emergency communication in several hurricanes. However, in reaffirming his earlier decision to deny Schoenbohm's license renewal, Luton concluded that Schoenbohm "made misrepresentations or lacked candor in his testimony about his felony conviction and *ex parte* communications."—FCC

## HAM RADIO NOW AN "OFFICIAL" ISS PAYLOAD

Amateur Radio is now considered to be an official payload on the International Space Station (ISS). In fact, reports Matt Bordelon, KC5BTL, at Johnson Space Center, ham radio was the *first* payload to become official. Bordelon already has started the training program for the first crew who will be putting together the ISS starting in January 1999.

The SAREX Working Group and the ARISS International team have met with members of the International Space Station Program Office to ensure that ham radio has a place aboard the ISS.

Bordelon says the ISS Payloads Office lists Amateur Radio as being onboard the ISS in three phases. The first calls for delivery of a transportable Amateur Radio station (probably hand-held transceivers). With the first crew scheduled to arrive in January 1999 for a five-month stay, this will allow the crew to establish voice and packet contact with friends, family, school groups and other earthbound hams. It will operate from within the Russian service module, which is to serve as the primary crew residence during the early assembly period.

The next phase will include a ham radio site on the so-called Express pallets, possibly for a repeater or microsat-type system. The pallets—due to arrive on the ISS in January 2002—will have power, thermal, and telemetry connections plus good Earth visibility.

The final phase is a permanent station on the US Habitation Module, set for delivery sometime in 2002. It will have good Earth visibility and plenty of feedthroughs for external antennas. During the ISS international partners meeting in Houston in late 1996, the team agreed that this station should include slow and fast-scan TV, packet, voice, and experimental modes. It will include several frequency bands and modes (SSB and FM) and be able to interconnect with the ISS audio and video subsystems.

"This is truly a monumental decision

which will solidify the future of Amateur Radio on manned space vehicles," said AMSAT-NA Vice President for Manned Space Programs, Frank Bauer, KA3HDO. Joerg Hahn, DL3LUM, of the German SAFEX team also welcomed the news as "a good sign to know that the ham activities will be an official part of ISS." The ARISS team includes members from Great Britain, Germany, Italy, France, Japan, Russia, Canada and the US.

For more information on the International Space Station and the planned assembly sequence, see <http://station.nasa.gov/station/assembly>.—AMSAT News Service/Frank Bauer, KA3HDO

## KC5VPF ON THE AIR FROM MIR

By mid-October, US astronaut Dave Wolf, KC5VPF, had settled in aboard the Russian *Mir* space station to the point that he finally got a chance to get his feet wet on ham radio on Columbus Day. Tom Crowley, KT4XN, in Atlanta, Georgia, reports he responded to Wolf's CQ as the

spacecraft passed over Southern Florida. "We talked for about 5 or 6 minutes on 145.985 MHz," Crowley said.

The contact between Wolf and Crowley was the first reported *Mir*-to-Earth FM voice contact since Wolf, a relatively new ham with little on-the-air experience, joined the *Mir* crew in September. On October 5, Wolf felt confident enough to post what was probably his first packet message on the RØMIR system to Francisco Costa, CT1EAT. The message said, "New at ham, but will give it a try. Dave." KC5VPF also has been monitored over Europe calling CQ on 2-meter FM.

NASA has announced that US astronaut Andrew "Andy" Thomas, KD5CHF, will be the final US crew member aboard *Mir*. Thomas will launch aboard the shuttle *Endeavour* in January 1998 for a four-month stay. His scheduled departure in May will conclude more than two years of continuous American presence on *Mir*, which began in March 1996 with the arrival of astronaut Shannon Lucid.

## In Brief

• **ARRL Audio News debuts:** The League inaugurated *ARRL Audio News*, a weekly, Web-based audio news service, on October 17. Compiled from *The ARRL Letter*, *ARRL Audio News* includes the week's top news from the world of Amateur Radio and the League. *ARRL Audio News* is available in *RealAudio* format via the ARRLWeb, <http://www.arrl.org/>. Tucson Amateur Packet Radio—TAPR—has generously agreed to provide space on its Web server to permit the League to offer this service. Senior Assistant Technical Editor Rick Lindquist, N1RL, who compiles and edits *The ARRL Letter* is the regular on-air voice for *ARRL Audio News*. The service is available free to anyone and may be retransmitted in whole or in part on VHF/UHF for bulletin purposes provided *ARRL Audio News* is credited as the source. Each edition of *ARRL Audio News* will contain up to 10 minutes of timely Amateur Radio news. It is available via the ARRLWeb every Friday by 9 PM Eastern Time. Dial-up telephone access to *ARRL Audio News* will be announced later. For more information, contact Rick Lindquist, N1RL, e-mail [n1rl@arrl.org](mailto:n1rl@arrl.org); tel 860-594-0222.

• **ARRL debuts 160-meter book:** The ARRL has introduced *DXing on the Edge—the Thrill of 160 Meters*, by Jeff Briggs, K1ZM. *DXing on the Edge* gives an insider's view at what it takes to make it on 160 meters and includes lots of interesting Topband history plus an audio CD of some exotic and exciting QSOs made from prominent DX stations. It's \$29.95 (plus shipping). Order Item No 6354. Call toll-free 888-277-5289 or see <http://www.arrl.org/catalog/6354>.

• **QST Cover Plaque winners:** Robert W. Schmieder, KK6EK, won the September 1997 *QST* Cover Plaque for his article, "The 1997 VK0IR Heard Island Expedition." Michael Nie, KB8VMX, won the October *QST* Cover Plaque for his article "The Ohio River Flood of '97." Congratulations, Bob and Michael!

• **AMSAT board election results:** The results are in for the annual AMSAT Board of Directors balloting. A total of 1386 members voted in this year's election. Elected to two-year terms were Bill Tynan, W3XO (1234 votes); Stan Wood, WA4NFY (1161 votes); Dick Daniels, W4PUJ (1114 votes); and Joe Holman, AD7D (933 votes). Barry Baines, WD4ASW (842 votes), will serve as the alternate until the next AMSAT Board election. Tynan was also re-elected president of AMSAT-NA when the Board of Directors met in Toronto in October.—AMSAT News Service

• **Azden, not Alinco:** To alleviate some confusion in the Amateur Radio community, the company that recently pulled out of the US ham radio market was Azden, based in New York, *not* Alinco, which is on the West Coast. Alinco reminds hams that it's still very much in business.

• **Ham radio at the CMA Awards:** Country music star Patty Loveless, KD4WUJ, did not repeat as female vocalist of the year at the 31st Country Music Association awards. Loveless had won the award two years running. Country legend Ronnie Milsap, WB4KCG, announced the nominees and this year's winner, Trisha Yearwood. During the awards telecast September 24, Loveless performed her latest, "You Don't Seem to Miss Me," with help from another legend, George Jones.

# Moved & Seconded

## MINUTES OF THE EXECUTIVE COMMITTEE NUMBER 454

PHILADELPHIA — OCTOBER 11, 1997

### Agenda

1. Approval of minutes of July 17, 1997, Executive Committee meeting
2. FCC matters
3. Legislative matters
4. Antenna/RFI matters
5. Other legal matters
6. International matters
7. Organizational matters
8. Recognition of new Life Members
9. Affiliation of clubs
10. Approval of conventions
11. Date and place of next meeting
12. Other business

Pursuant to notice, the Executive Committee of the American Radio Relay League, Inc., met at 8:30 AM Saturday, October 11, 1997, at the Airport Marriott Hotel, Philadelphia, Pennsylvania. Present were President Rodney Stafford, KB6ZV, in the Chair; First Vice President Stephen A. Mendelsohn, W2ML; Executive Vice President David Sumner, K1ZZ; and Directors Mary Lou Brown, NM7N, Frank Butler, W4RH, Kay Craigie, WT3P, and Fried Heyn, WA6WZO. Also present were International Affairs Vice President Larry E. Price, W4RA, Directors Frank Fallon, N2FF, Tom Frenaye, K1KI, John C. Kanode, N4MM, and Edmond A. Metzger, W9PRN, General Counsel Christopher D. Imlay, W3KD, and Legislative and Public Affairs Manager Steve Mansfield, N1MZA.

1. On motion of Mr. Mendelsohn, the minutes of the July 17, 1997, Executive Committee meeting were approved in the form in which they had been distributed.

2. FCC matters were considered as follows:

2.1. Mr. Imlay reviewed the status of RM-9096, the petition by ITS America for access to 5850-5925 MHz for Dedicated Short Range Communication (DSRC) systems as part of the Intelligent Transportation System architecture in the United States. One commenter, 3M, has taken the position (which is contrary to the position of ITS America) that amateurs, along with Part 15 and Part 18 devices, should be excluded from the band. The ARRL will continue to oppose this, and to support the elevation of the Amateur Service to primary status at 5650-5725 and 5825-5850 MHz.

2.2. On September 16 the FCC issued a Memorandum Opinion and Order in PR Docket 93-61, regarding Automatic Vehicle Monitoring and Location Monitoring Services (AVM/LMS) in the 902-928 MHz band. The ARRL had filed a petition for reconsideration in this proceeding to defend continued amateur use of the band at power levels above those permitted to nonlicensed Part 15 devices. The FCC continues to maintain that amateur operation above those levels will subject amateurs to LMS operators' claims of harmful interference. On motion of Mr. Heyn, the General Counsel was instructed to seek an FCC declaratory ruling to establish that the burden of proof is on AVM/LMS systems in the event of a claim of harmful interference from the Amateur Service.

2.3. Since the July Board Meeting there has been no perceptible activity at the FCC on the petition of Checkpoint Systems, Inc., seeking relief from Part 15 restrictions for their antiquated anti-pilferage technology. The ARRL filed comments in opposition on the grounds that increased HF interference would result.

2.4. Numerous comments, most of them

supportive, were filed on the ARRL petition, RM-9150, which seeks to improve the FCC's handling of private-sector complaints of serious amateur rules violations.

2.5. Sierra Digital Communications, Inc., has filed a request for temporary waiver and petition for rule making seeking increased power for their product, an unlicensed point-to-point data communications link operating under Part 15 rules at 24 GHz. On motion of Mrs. Craigie, the General Counsel was instructed to file in opposition to both the waiver request and the petition for rule making.

2.6. The ARRL petition to allow greater flexibility in RACES communications, RM-9115, drew no opposing comments. The timetable for the possible release by the FCC of a Notice of Proposed Rule Making incorporating this proposal is unknown.

2.7. The Amateur Supplement to OET Bulletin 65, which is to explain how amateurs are to comply with the new RF exposure regulations, reportedly is still in rough draft form although its release has been promised for November. The ARRL is participating in the review of the draft through the RF Safety Committee and Laboratory Supervisor Ed Hare, W1RFI. The ARRL continues to pursue FCC preemption of local and state attempts to regulate in this field.

2.8. The comment period has closed on the FCC Notice of Proposed Rule Making to change the rules governing amateur spread spectrum operation, WT Docket 97-12, but the timetable for possible FCC action is unknown. Without taking formal action, the committee discussed whether the use of spread spectrum techniques might permit amateurs to make greater use of the 219-220 MHz band without interfering with the primary occupant, the Automated Maritime Telecommunications System (AMTS). This subject will be revisited at the next meeting.

2.9. An ARRL petition, RM-8763, seeks enhancement of the PRB-1 limited federal preemption of state and local regulation of Amateur Radio antennas. The FCC appears to have made no progress with regard to this petition. On motion of Mr. Mendelsohn, it was voted that the League continue to urge adoption of the antenna regulatory preemption policies contained in its petition, RM-8763, and that it submit comments in MM Docket 97-182 supporting a comprehensive antenna facilities siting policy, including amateur antenna structures.

2.10. The ARRL petition to expand 40-meter privileges in American Samoa, RM-9106, has not been acted upon.

2.11. FCC staff has noted that some call sign blocks are reserved for locations where, because the locations cannot be reached via the Postal Service and therefore have no mailing addresses, no call signs can be assigned under present FCC procedures. Mr. Sumner reported that demand for 1x1 special event call signs is low, with just 54 call signs having been coordinated during the first six weeks of the program (35 of them through the ARRL). There is some demand for special event call signs outside of the 1x1 block. On motion of Mr. Heyn, staff was requested to study a possible expansion of the existing special event call sign program and to report prior to the next meeting of the committee.

2.12. Mr. Imlay reported that the FCC is permitting AMTS licensees to offer service on a secondary basis to land mobile stations (PR Docket 92-257). This may tend to reduce the willingness of AMTS licensees to coordinate amateur operations at 219-220 MHz.

2.13. The ARRL petition to modify FCC procedural requirements for medical exemptions from Morse code examinations was filed on September

23, and has not yet been given an RM-number.

2.14. Mr. Imlay distributed a draft petition responding to the Board's instruction at Minute 63 of the 1997 Second Meeting. The draft requests that the FCC add the following sentence to Section 97.101(a) of the Rules: "Amateur operators should be familiar with, and should abide by, the voluntary band plans that are applicable to the frequency bands in which they operate." During the course of discussion, Mr. Heyn indicated his strong desire to file the petition as soon as possible. However, other committee members expressed the view that the full Board should take into consideration information developed in the course of preparing the petition before the petition goes forward. Work on the item is continuing.

2.15. At the request of Mr. Kanode, the committee considered possible changes in the rules governing the operation of repeaters during autopatch conversations. No action was taken.

2.16. Mr. Imlay reported that an FCC Daily Digest item had implied that the appeal of Herbert Schoenbohm, KV4FZ, of the FCC decision to not renew his amateur license had been dealt with administratively, and denied. In fact, Mr. Schoenbohm's administrative appeals have not yet been exhausted.

2.17. In response to a question, Mr. Imlay reported that there has been no further FCC action on the waiver request of EDAP Technomed for authority to operate an ISM device on 1296 MHz at power levels far beyond what is permitted at that frequency. The ARRL continues to vigorously oppose the waiver request.

3. Mr. Mansfield reported on legislative and public relations matters as follows:

3.1. The ground rules for organizational participation in The Alliance for Youth, the program that grew out of the President's Summit for America's Future earlier in the year, have changed somewhat since the program was first announced. The ARRL has applied to participate through a "Radio Coaches" program, using Amateur Radio volunteers to introduce young people to careers in technology as well as to Amateur Radio. We are now waiting to see whether our application is acceptable under the new rules, or whether it will require modification.

3.2. Legislation is moving very slowly in Congress, with budget, appropriations, and authorization bills occupying much of the Congressional calendar. Amateur Radio spectrum protection legislation has not yet been introduced.

3.3. H.R. 2369, a bill "to strengthen and clarify prohibitions on electronic eavesdropping, and for other purposes," has caused great concern among ARRL members. A "Dear Colleague" letter dated September 30 from Telecommunications Subcommittee Chairman Billy Tauzin, R-LA, necessitated the distribution of an ARRL White Paper explaining why we believe the legislation should not be supported in its present form.

3.4. H.R. 2383, introduced in the House on September 3 by Representatives Ehlers (R-MI) and Coble (R-NC), attempts to permit the local enforcement of CB rules violations but falls short of the safeguards for licensed services, including the Amateur Radio Service, that are contained in similar legislation, S. 608, introduced earlier in the Senate by Senator Feingold (D-WI).

3.5. Hearings have been held on the four nominees for the FCC, but the Senate vote on the nominations has not yet been scheduled.

The committee was in recess for luncheon from 12:07 to 1:17 PM.

4. Mr. Imlay reported on local antenna/RFI regulatory matters as follows:

4.1. In *Korins v. Kornienko*, a New Jersey case, the ARRL has submitted a carefully re-

searched *amicus curiae* brief reciting the law on preemption of radio frequency interference. Mr. Fallon noted the efforts of the Amateur Radio community to raise funds in support of Mr. Kornienko's defense.

4.2. A new ordinance in Milwaukee, Wisconsin, apparently aimed at broadcast and commercial antenna installations, does not adequately exempt radio amateurs. The local amateur community is seeking appropriate amendments.

4.3. In *State of Florida v. Joseph Osborn*, a trial court has dismissed criminal claims brought against a radio amateur for possession of a transceiver capable of receiving police communications and has ordered the equipment returned to him. The case was handled successfully by an ARRL Volunteer Counsel.

4.4. The status of FCC enforcement actions in the Amateur Radio Service was discussed briefly. The General Counsel was asked to include the status of pending cases in his regular reports to the committee.

#### 5. With regard to other legal matters:

5.1. The committee was in executive session briefly to review personnel matters and the status of litigation to which the ARRL is a party.

5.2. Mr. Imlay reported that trademark applications have been filed for "VUCC" and "Repeater Directory." He will supply a list of all trademarks registered by the ARRL.

6. The following international matters were discussed:

6.1. Mr. Stafford entertained questions on the IARU Region 3 Conference in Beijing. Some Directors reported being asked by members why it was necessary for the ARRL to send five representatives to this conference, since there are relatively few full members of the ARRL who reside in Region 3. Mr. Stafford and others noted that the conference provided a unique opportunity to meet with the leaders of Amateur Radio from the countries of the Asia-Pacific area by traveling to a single location, and to renew or establish personal relationships that may be important in achieving Amateur Radio's international goals. Mr. Price called attention to Mr. Sumner's role as recording secretary of the conference working group dealing with World Radiocommunication Conferences and other ITU issues.

6.2. Mr. Price reported on preparations for the 1997 World Radiocommunication Conference, WRC-97, which opens in Geneva later in the month. Paul Rinaldo, W4RI, is a member of the United States delegation; the ARRL is responsible for his expenses but he is, of course, obliged to adhere to United States policy at all times and to perform any functions to which he is assigned irrespective of whether the ARRL has an interest in the issue. Mr. Price, on the other hand, will attend as a member of the IARU delegation and is free to represent the IARU position at all times. Other IARU representatives will also be present, and the national delegations of Australia, Canada, and Japan are expected to include Amateur Radio delegates on a basis similar to that of Mr. Rinaldo. Mr. Price reviewed briefly the IARU objectives for WRC-97 and WRC-99.

6.3. Mr. Butler reviewed correspondence from the Friendship Amateur Radio Society, USA (FARS), an organization that promotes international events to bring together radio amateurs from different countries. FARS has asked that the ARRL appoint a coordinator to promote IARU-style Amateur Radio Direction Finding (ARDF) in the United States. After discussion, on motion of Mr. Butler, staff was directed to prepare a white paper on the subject for consideration at the next meeting.

6.4. The work of the ARRL Washington Office to investigate a possible allocation to the Amateur Service in the vicinity of 5 MHz was reviewed. Mr. Sumner was asked to prepare, prior to the next meeting, a paper outlining the steps to be taken to secure such an allocation.

#### 7. Organizational matters:

##### 7.1. Articles of Association and Bylaws:

7.1.1. It was agreed that because of the limited time remaining for this meeting, the review of Article 11 and of the Bylaws would be continued at the next meeting.

7.1.2. With regard to the assignment given

to the Executive Committee at Minute 54 of the 1997 Second Meeting, after discussion of the Final Report of the Governance Committee and on motion of Mrs. Craigie it was voted that the Executive Committee recommends to the Board the creation of the category of International member encompassing present associate members who are licensed but are not eligible for full membership.

7.1.3. On motion of Mr. Butler, it was voted to recommend to the Board the addition of the following sentence to Bylaw 35 as new responsibility of the International Affairs Vice President: "He shall bring to the Board the concerns of members in other countries."

7.2. In July, Board members were asked to comment on draft ethical guidelines for members of the ARRL Board of Directors. After review of the comments received, it was determined that the draft merits further review and discussion by Board members. The draft will be redistributed to Board members with a request for comment prior to the January meeting of the Board.

#### 7.3. Strategic Planning:

7.3.1. Mr. Sumner presented a report on the status of strategies previously adopted by the Board. Mr. Stafford said he will review the report and make assignments with regard to those items on which action has not yet been completed.

7.3.2. A document that had been given to the Board in July, suggesting how the League might develop a procedure for updating its strategic plan, was discussed. On motion of Mr. Heyn, it was voted that the President and Executive Vice President shall develop a plan to reinitiate the strategic planning process along the lines discussed, to be brought to the next meeting for presentation to the Board.

7.4. In response to Minute 31 of the 1997 Second Meeting of the Board, President Stafford had assigned to Vice Director Bernie Fuller, N3EFN, the task of preparing a preliminary report on the development of endowment funds for certain essential ARRL activities. The preliminary report had been distributed to the Executive Committee prior to the meeting. On motion of Mr. Mendelsohn, it was voted to recommend to the Board that Mr. Fuller's report be used as the basis for further planning.

7.5. Mr. Imlay reported that the draft Alternative Dispute Resolution procedure would be shared with Volunteer Counsel for their comments shortly.

7.6. Draft "Guidelines for Responding to Mail or e-mail From Out-Of-Division Members" prepared by Mr. Mendelsohn were reviewed. It was agreed that comments on the draft should be solicited from the full Board.

7.7. Director Tod Olson, K0TO, had suggested that the agenda for ARRL Board meetings be organized more along topical lines. After discussion, it was agreed that Mr. Olson should be invited to share his thoughts on this subject in more depth.

7.8. On motion of Mr. Butler, it was voted to recommend to the Board that the Technical Excellence Award be renamed the Doug DeMaw Technical Excellence Award, as has been requested by several of the members who have earned this award.

7.9. On behalf of the Computer Committee, Mr. Mendelsohn reported that the committee invites Directors to make greater use of the telephone conference bridge at ARRL Headquarters. Ways to improve e-mail service to Board members are under consideration.

8. On motion of Mr. Heyn, 31 newly elected life members were recognized and the Executive Vice President was instructed to list their names in QST.

9. On motion of Mrs. Craigie, the following clubs were declared affiliated:

#### Category 1

Addison County Amateur Radio Association, Vergennes, VT

Calnet South Repeater Group, Corona, CA

Carson Valley Radio Club, Minden, NV

Central Area Repeater Association, Dresden, ME  
Chaffee - Lake Amateur Repeater Association, Buena Vista, CO

Disaster Communications Repeater Association, Bakersfield, CA

Jupiter Tequesta Repeater Group, Inc., Jupiter, FL  
Marion County Amateur Radio Society, Indianapolis, IN  
McKean County Public Service Group, Bradford, PA  
Northern Carolina Alligator Group, Gold Hill, NC  
Northern Hills Amateur Radio Club, Lead, SD  
Valley Center Amateur Radio Club, Valley Center, KS  
Zekiah Swamp VHF Society, Bryantown, MD

**Category 3**  
Cy-Fair High School Amateur Radio Club, Cypress, TX  
Harrison High School Amateur Radio Club, Evansville, IN  
Inland Valley Schools Amateur Radio Club, Ontario, CA

**Category 4**  
International Hamfiesta, El Paso, TX

The ARRL now has the following numbers of active affiliated clubs: Category 1, 1982; Category 2, 27; Category 3, 163; Category 4, 11; total, 2183.

10. On motion of Mr. Butler, the holding of the following ARRL conventions was approved or their earlier approval by mail vote was ratified:  
New England DXCC Convention, October 12, 1997, Chelmsford, MA  
Mississippi State, February 7-8, 1998, Jackson, MS  
West Texas Section, March 14-15, 1998, Midland, TX

Southeastern Division, April 18-19, 1998, Birmingham, AL

Midwest/Dakota Division, May 29-30, 1998, South Sioux City, NE

Arizona State, July 24-26, 1998, Flagstaff, AZ  
Roanoke Division, September 19-20, 1998 (new dates), Virginia Beach, VA

Pacific Division, October 16-18, 1998, Concord, CA  
Southern Florida Section, November 21-22, 1998, Tampa, FL

11. It was agreed that the Executive Committee will meet at 9:00 AM Thursday, January 15, 1998, at the Marriott Hotel, Rocky Hill, CT.

#### 12. Other Business:

12.1 The Secretary noted for the record the following action of the Board taken by mail vote. The Election Committee had declared Nicholas R. Smith, WA4GKM, to be ineligible to be a candidate for Director of the Delta Division by virtue of a business connection of the kind that is prohibited by Article 11 of the ARRL Articles of Association. Mr. Smith appealed the decision to the Board. There were 13 votes to sustain the decision of the Election Committee, and two abstentions. Those abstaining were Directors Roderick and Gordon; all other Directors voted to sustain the decision of the Election Committee. Accordingly, the decision was sustained.

12.2. Mr. Imlay reported briefly on the status of an estate of which the ARRL is the principal beneficiary. A partial distribution of the estate is anticipated soon.

There being no further business, the meeting was adjourned at 6:27 PM.

Respectfully submitted,  
David Sumner, K1ZZ  
Secretary

## LIFE MEMBERS ELECTED OCTOBER 11, 1997

Raymond A. Allard, K1MFZ; Henry W. Alvestad, Jr, K2XJ; Geoffrey Apgar, W7JEZ; Louis Austin, KD4JSX; William Boedeker, KB5ZDV; Walt Bolte, N9BXR; Charles L. Cooper, N4TIS; Beverly L. Cossalter, N1OKG; Andres Crespo, WP4KYJ; Donna M. Dunnehoo Jones, KB4MYE; Peter W. Eaton, W5FP; William P. Fawns, KE6HEZ; Michael G. Graham, NE1V; Neil Halin, WA3RPG; James T. Harrell, N0OSV; Douglas W. Hogarth, N7MOK; Thomas R. Hone, AA0GP; William M. Johnson, KN6OT; John Kyriazis, N6VEG; Charlotte R. Lee, KC5DOR; Timothy W. Mays, N8ZDZ; R. M. McCubbin, WB6EQB; Steven C. McCubbin, KF6AOR; Hector L. Nieves, KP4LS; Chris Platt, VK3KCP; David A. Poulsom, N7KFL; Stanley Slonkosky, KE6ZC; G. Clifton Smith, K6JN; Walter H. Statton, WA7KNK; Stephen R. Stewart, N3UOB; Allan L. Yackey, WB9PKM.

Edited by **Bill Kennamer, K5FUV** • DXCC Manager

## 9N1UD On the Air!

By Charles Harpole, K4VUD/9N1UD  
3100 N Highway 426  
Geneva, FL 32732  
e-mail [harpole@pegasus.cc.ucf.edu](mailto:harpole@pegasus.cc.ucf.edu)

My DXpedition dreams began with old textbooks in grade school, books so old that there were still "uncharted territories" marked in the geography maps. I wanted to go to those cross-hatched areas on the maps. When I became a ham operator as a teenager, there was additional reason to do so: I wanted to operate DX from those blank spots on the map!

After operating the July 1994 IARU contest from the US Virgin Islands, and a week spent with the FRC boys on V2 for another contest, I knew that combining my two favorite ham activities—contests and DX—was for me. I began collecting my DXpedition gear (antenna tuner, lighter weight linear amplifier, ICOM 706 transceiver, Astron dc power supply, and dipoles).

My opportunity came with the invitation from the Tsurphu Foundation to go to Tibet to make a documentary film about the Karma Kagyu Buddhists and their spiritual leader. The Tsurphu Monastery is 70 miles or so north of Lhasa. On July 4, 1997, I departed from Orlando and, many stops later, arrived in Katmandu, Nepal. I had a total of 31 hours on airplanes, and more than \$800 in excess baggage charges. In Katmandu, I waited to get acclimated to the high altitude (after starting at 36 feet in Florida). I would soon get a tour into Lhasa.

### Operating from the Hotel

The hotel in Katmandu was great. The manager even helped me string the 20 meter dipole on the roof, the center held up by a bamboo pole. Prior to leaving, the ARRL had put me in touch with Satish, 9N1AA, as the contact for assistance with licensing in Nepal. He was great, meeting me at the airport and shepherding me through the 9N1 licensing process. I received the call sign 9N1UD and was ready to get on the air.

My operation netted more than 1600 contacts, all but one of which was on 20 meters, with nearly 400 of those coming during the IARU contest on July 12 and 13. Actually, I feel that I could have done more during the contest, but the pileups were too heavy. It's good to be rare, but being the only IARU Zone 42 station in the contest may have been a little *too* rare. Of course I operated split frequency, but I also found it necessary to call by the numbers to spread everyone out. That technique seemed to

work well, as it is very hard to call by countries or zones, especially when propagation is really good into only one or two countries. I recommend calling for "any ones," then "any twos," and so on. That seems to work regardless of the prefix. Also, I changed numbers with every contact so that the maximum wait time was nine contacts for another chance to call.

That procedure led to very orderly pileups. JAs were very disciplined, and it was quite gratifying to hear the whole pileup from Europe as well as elsewhere standby as I asked for USA stations. Propagation into the US was very poor, and often I received no answers to "USA only" CQs. I did work some CW, but again very few USA takers despite what I had been told is a huge demand. CQing on 40 meters yielded mostly QRN.

Dick, 9N1ARB, has a great fixed station in Katmandu, and it was wonderful to visit there as well. When in the country, he's on nearly every day, chatting with friends in VK and the Far East. What a treat to hear South Korea and Bangladesh coming in like locals (which they were, more or less). The UA and other CIS nations were also very strong, with 20 meters open virtually around the clock.

Dick hosted a get together for all the 9N hams while I was there, and all six showed up. We joked about the slim numbers, but the Minister of Communications was also there with promises of helping create more Nepalese hams. 9N1AA will be on the air again soon, after completing a change of quarters. He has some aspirations for satellite work too, but needs gear. Access to ham gear and to good mail service is a problem in Nepal, but the telephones work great!

After Nepal, I moved on to Lhasa. While I couldn't get permission for an Amateur Radio operation, I was able to get some wonderful still and moving picture shots. Now, I want to return there with a big film crew and get more footage.

The local hams were wonderful in Nepal, and the ham radioing from there was a blast. But can I keep up with the incoming QSL requests?

### QSLING TIPS

QSLing is a chore that the DXers will always face. As the years have passed, however, the return rates have fallen. Many DXers lament their poor QSL return rate. Yet, as often as not, modern QSLing requires more attention to detail than ever

before. The DXer should use a method that makes it easier for the DX station to fulfill QSL requests, thus increasing the chances of success.

William Plum, of William Plum DX Supplies, 12 Glenn Road, Flemington, NJ 08822-3322, has put together a publication, *The SASE Method*, based upon the results he and his customers have obtained in securing those rare QSLs. As the title implies, it's based upon using foreign stamps and SASEs to send for those prized QSLs. Many of the testimonials boast returns of more than 90% over other methods, such as the Green Stamp and IRC.

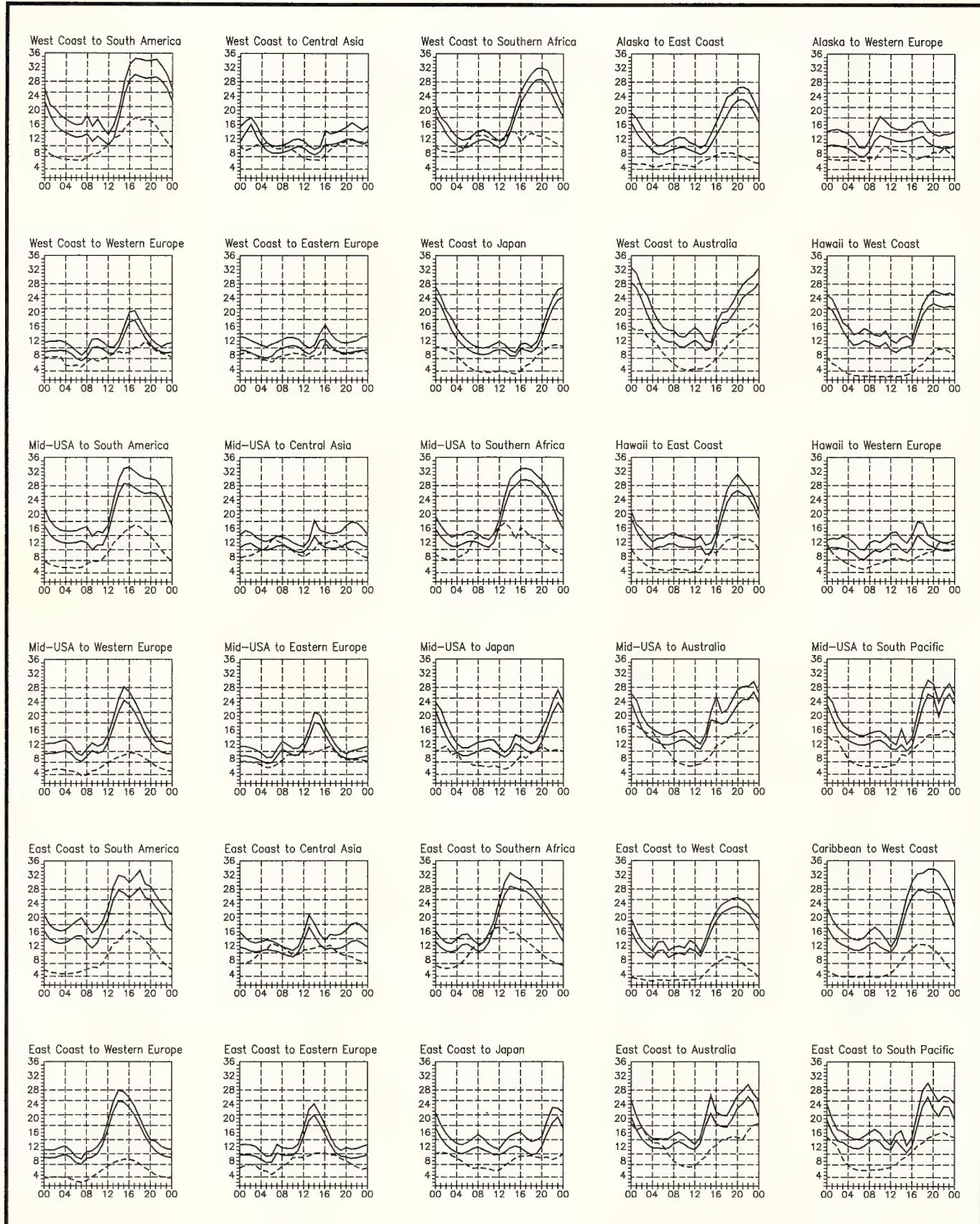
While the key to Plum's method revolves around the use of mint foreign stamps, there are more tips than just stamps. Many of them you may have heard for years, but probably have not tried. For example, use of two envelopes, one of which fits inside the other without folding. The envelopes should be the world-standard size, not a US no. 10. These envelopes blend into the world mail stream without standing out like a sore thumb as US envelopes do. This is a great deterrent to mail theft.

Preparation of the envelope is also important. Names and addresses should be printed, not written in script. Leaving the call signs off is a good idea; they tend to draw unwelcome attention. Placing the card inside the return envelope (don't seal the flap!), turning it upside down (so the letter opener doesn't cut the flap) makes for a tidy package.

Now think about how the DX station can handle the envelope. He doesn't have to address an envelope. He doesn't have to dispose of an IRC or Green Stamp to obtain postage (would you be in a hurry to go to the bank or post office to cash a Green Stamp or IRC?), and he doesn't have to lick stamps (ugh!). All he has to do is find the log entry, fill out the card, and it's out the door. You've made it easier for him to provide what you want.

The book has similar small tips for improving your returns. Anything that reduces your chances of having to QSL twice is bound to save money. The book is \$5, and includes a catalog of available stamps, envelopes and other supplies.

If you have access to the World Wide Web, you may also want to check out the Air Mail Postage site operated by James E. Mackey, K3FN, at <http://www.net1plus.com/users/ryoung/index.htm>. James sells return postage, envelopes, rubber stamps and more.—K5FUV



**When are the bands open?** These charts, generated using IONCAP, show probabilities for average HF propagation from December 16, 1997 to January 15, 1998, for the paths indicated. The horizontal axes show Coordinated Universal Time (UTC), and the vertical axes frequency in MHz. On 10% of the days of this period, the highest frequencies propagated will be at least as high as the upper curves, and on 50% of the days they will be at least as high as the lower solid-line curves. The broken lines show the lowest usable frequency (LUF) for a 1500-W CW transmitter. For SSB or a lower transmitter power, the LUF will be somewhat higher than the curves indicate. See October 1994 *QST*, pp 27-30, and February 1995 *QST*, pp 34-36, for more details. The predictions for this period assume an observed 2800-MHz solar flux value of 96.

# DX Century Club Awards

Edited by Bill Kennamer, K5FUV • DXCC Manager

The ARRL DXCC is awarded to amateurs who submit written confirmation for contacts with 100 or more countries on *The ARRL DXCC Countries List*. The totals shown below are exact credits given to DXCC members from August 1 to 31, 1997. There were 329 current countries at that time. The DXCC rules and application forms are contained in the *ARRL DXCC Countries List*, available for \$2 from Publication Sales. The DXCC Web Site may be found at <http://www.arrl.org/awards/dxcc/>.

<b>TOP OF THE HONOR ROLL</b>	WB3FID/112	JG2TKH/119	<b>ENDORSEMENTS</b>	JE2VLO/334	SM7NDX/271	W4PWF/103	CX3CE/317	JL1IHE/276	K4ZIN/199
	K4DDJ/164	JQ1VNM/110	<b>Mixed</b>	JE4MZA/210	US1IDX/307	W4TVQ/146	CX6BZ/304	JL1TXC/285	K4ZO/332
<b>Mixed</b>	N4EK/195	OE1ZU/305	CE3GDN/302	JF1RW/323	UU1JA/320	W4USN/314	DK2WH/336	JL1UXH/301	N4AA/249
329	WE9A/292	KSALD/123	DS5RNM/227	JF1PUW/337	VE2RO/250	W4WX/314	DSSRNM/227	JL1XMN/310	N4CH/331
JH1ORA/340	K0OZ/213	KI6T/150	F3SG/325	JF1UVJ/331	VE3FRR/289	AD5A/320	EA1ET/173	JM1GYQ/249	N4RU/328
	W0ZZQ/167	NY7T/110	F9XL/340	JF1ZFR/225	XE1AE/368	AD5W/277	F3SG/298	JM1JIV/301	N4RXL/149
<b>Phone</b>	CW	W8AEF/106	G3AEZ/330	JF2BNG/316	YU1AB/343	KA5VFU/225	IN3DEI/339	JM1LPN/124	N4SU/322
329	KJ9O/118	G3VDL/256	JF6OJX/329	ZS6JHS/285	KB5CSO/237	JA1ASO/318	JM1VRW/289	WA4LPM/283	
JH1ORA/338	BV7FN/104	<b>6 Meters</b>	IN3DEI/340	JF6WBP/328	ZS6YQ/365	KB5GL/337	JA1CLW/306	J01ABS/318	W4IBI/219
	JA1DOF/112	JA1BNW/347	JG1HND/328	7K2PZG/180	KB5OHT/283	JA1DOJ/327	JQ1VNM/181	W4OGG/256	
<b>CW</b>	JA1SNF/118	JA6SBW/107	JA1CLW/317	JG1SFX/335	7L1MFS/149	KC5AK/188	JA1EOD/355	JR1CQZ/135	WA4USN/309
329	JA3QG/140	JO1HQ/103	JA1DIO/339	JG1CTB/254	7L1WII/326	KD5ZM/333	JA1EPL/319	JR1EFQ/212	W4VDA/271
JH1ORA/334	JA6VQA/105	<b>NEW HONOR</b>	JA1DJO/327	JG1WRT/226	7L2VWT/198	KC5PO/330	JA1FUI/278	JR1ITT/287	W4WVX/310
	JA8IY/312	JA9XW/161	JA1EOD/355	JG3NKP/259	7M2VPR/125	KF5MY/341	JA1GYO/229	JR1KAG/310	AD5A/284
<b>NEW MEMBERS</b>	JA1RWR/103	<b>ROLL MEMBERS</b>	JA1EOD/355	JG3QZN/332	7N1EXA/224	K5ALD/232	JA1HGJ/332	JR1LEX/172	AD5W/270
	Mixed	JF1RWR/103	Mixed	JA1FGB/339	JH1AGU/338	7N1GMK/159	K5AS/336	JR5VHU/316	K45VFU/225
<b>DS1BHE/125</b>	JH1SVO/112	328	JA1FUY/308	JH1BAM/316	7N2UTO/228	K5EJ/344	JA1KNS/275	JR6AMD/291	KB5CSO/237
DS5USH/132	JH2NWP/129	JA2CYL/328	JA1GYO/229	JH1BSJ/290	7N3AWE/165	K5GZ/339	JA1KRW/320	JS1PBI/227	KB5GL/336
EY8MM/314	JL1UXH/120	JA3GSM/342	JA1HGY/351	JH1GTR/178	KA1EJ/331	K5HKX/223	JA1MOH/302	KP4RV/222	KB5OHT/201
HK3BZD/226	JA3QDE/145	327	JA1JAT/280	JH1IED/335	KA1HIS/176	K5IH/331	JA1NWD/332	OE2BZL/225	KC5AC/177
JA1DOF/119	JR3QHO/127	OE1ZJ/350	JA1KNS/321	JH1OGT/253	KV1J/293	K5LA/326	JA1QWT/302	ON4ACG/323	KC5AK/187
JA1HP/166	OE1ZJ/325	325	JA1KRW/322	JH1QAX/300	K1DPB/321	K5OO/222	JA1SGU/307	ON4ON/305	KE5PO/328
JA1NJA/107	W2OW/124	JA1MOH/344	JA1JUW/327	JH1QJC/289	K1ER/345	K5PSP/338	JA1SJC/282	ON5FP/332	KF5MY/261
JA1RNH/123	N5OL/110	JE1PNX/328	JA1MZH/317	JH1SJN/334	K1GW/330	K5XK/348	JA1VDU/267	OZ5MJ/326	K5ALQ/232
JA3QG/140	KB6CQ/101	324	JA1NWD/333	JH1XQ/318	K1MFZ/187	N5OHL/160	JA1WTI/345	OZ7DN/308	K5AS/331
JA4DC/121	N6QI/212	JA1SGU/337	JA1OHD/331	JH1XUP/310	N1QY/304	N5QDE/302	JA1XLU/222	PY3JZ/312	K5GZ/339
JA0RYN/119	AA7UC/116	JA1TUC/327	JA1OHD/331	JH2NPW/140	W1U/280	WA5HOD/327	JA1XLL/310	SM7NDX/201	K5H/331
JE1VJT/120	RTTY	323	JA1QOP/338	JH2NWP/140	W1CRL/329	WA5IPS/327	JA2AHH/202	SV1LK/327	K5JZ/338
JG2TKH/119	JG3QZN/114	WS7I/329	JA1QWT/331	JH2SON/332	W1D0H/331	WA5RNW/305	JA2CYL/251	SV1VS/282	K5OO/206
JH1SVO/112	JH1RCQ/116	322	JA1SJC/323	JH2TPV/220	W1LW/327	WA5SUE/330	JA2FGL/315	US1IDX/289	K5VVA/256
JH2VVF/121	JR2BNF/104	JA1TNV/283	JA1STF/323	JH6RFT/285	W1TSP/338	W5FKX/336	JA2H0/159	UU1JA/197	K5XX/309
JH3PAS/120	K4NA/123	JA1QCA/335	JA1VDP/343	JH7DFZ/334	KA2ANF/306	W5JYK/134	JA2QCX/327	VE3FRR/281	N1M/337
JK2VOC/120	W4WX/124	JA1RJU/327	JA1VNU/344	JH7NTW/178	KC2Q/329	W5NA/327	JA2QPY/334	XE1AE/368	N5FG/339
JL7BRH/120	JA8IY/323	JA1WT/348	JA1WT/348	KC2Q/329	W5N/320	JA2TBS/273	ZS6JHS/285	N5OKC/210	
JN6CYC/120	JA1VNU/327	JA1WT/165	JA1JMK/235	K2LPL/323	W5NQF/331	JA2WYN/334	ZS6YQ/364	N5QDE/302	
JO1TXS/119	JH0BDK/102	JA1EPL/327	JA1XLU/293	K2LMP/323	JA2YWN/334	JA2WYN/334	ZS6YQ/364	W5QDU/322	
JP1GHJ/120	160 Meters	W6OTC/326	JA1XXL/313	K2MFB/300	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JR4DAH/124	W2OW/124	JA2AHH/335	JA2EUF/335	K2RFW/335	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JR4PMX/118	DK2WH/107	320	JA2CUD/352	K2S/320	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JR6XIX/115	JA1BK/104	JA2FGL/332	JA2FGL/332	K2T/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
LX1JH/103	JA7BXS/113	JA1RJH/331	JA2FMW/335	K2W/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
VE3TKI/131	JA0DAI/103	JI1DHY/324	JA2H/340	K2Z/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
7N2PYF/120	OE1ZJ/105	K3OSX/324	JA2JPA/320	K2B/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
W1JO/153	OE3WQB/102	K4QL/328	JA2QCX/336	K2C/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
K2JG/162	ON4ON/112	KA2QPY/334	JA2QPY/334	K2D/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
N2JX/103	JU1JA/106	K7TCL/332	JA2TBS/330	K2E/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
WA2VQV/107	80 Meters	Phone	JA3APU/332	K2F/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
N3NY/130	325	JA3MLJ/271	JA1SKG/314	K2G/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
N3TBO/132	DS5RNM/133	JA1EMK/107	JA1EMK/107	K2H/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
WA3WAW/102	IK0DWN/329	329	JA3P/330	K2I/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
K4VRT/112	JA2QCX/118	322	JA4ZXZ/327	K2J/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
WB4MOG/215	OE1ZJ/276	320	JA5MOO/210	K2L/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
AB5QR/105	W1PNR/125	JA4LNG/326	JA5XAE/244	K2M/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
KJ6YK/106	KD2KS/141	7L1WII/325	JA6VOA/333	K2N/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
W6EAXD/228	WA2HZO/104	320	JA7BWT/334	JA7BWT/334	K2O/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322
W6FY/106	WB3FID/102	JA1DIO/332	JA1DIO/332	K2P/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
<b>Phone</b>	WB3LHD/100	JO1MOS/324	JA7IC/323	K2Q/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
W3TN/134	W3TN/134	JA7JU/345	JA7JU/345	K2R/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
CE8SFG/120	AJ9K/109	CW	JA7JU/345	K2S/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
DS1BHE/119	WE9A/101	324	JA7OWD/289	JN3SAC/305	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
F6GVS/178	40 Meters	JI2KXK/327	JA7RPC/328	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322		
HK3BZD/191	321	JA7QOK/333	JA7QOK/333	K2Y/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JA1EEG/107	JH3BZD/110	JA1NWD/326	JA8CDT/347	K2Z/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JA1NEJ/114	JA1DOF/119	JA1NWD/326	JA1NWD/326	K2A/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JA1NJA/106	JA1SGU/108	N4SU/329	JA8CDT/347	K2B/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JA4DC/121	JA2FGL/104	JA9BPN/333	JA8CDT/347	K2C/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JA8IY/281	JE1VZT/161	320	JA9CGW/338	JA9CGW/338	K2D/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322
JA9XW/106	JH1VNU/112	JA1BNW/324	JA9IFF/257	K2E/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JE1CPB/100	JI1NJC/120	JA1BNW/324	JA1BNW/324	K2F/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JE1VJT/120	JL1UXH/108	JA1BNW/324	JA0AMN/149	K2G/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JE0EHE/120	JQ3DUE/133	5B DXCC	JA0B/333	K2H/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JG2TKH/113	JR3QHO/127	AJ9K	JA0B/333	K2I/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JH1XQ/138	OE1ZJ/302	CX3CE	JA0CVM/332	K2J/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JI1JMK/118	SM7NDX/101	IK0DWN	JA0KSB/208	K2K/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JL7BRH/120	W3TN/189	JA1NWD	JA0NPQ/319	K2L/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JM1TWR/127	K4VW/127	JA6CY	JA0SLU/347	K2M/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JO1TXS/119	WA4BIM/106	OZ7DN	JA0UMV/309	K2N/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
JS1XGS/120	W5NX/110	VE7EW	JA1AMA/333	K2O/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
KH0CG/113	N6QI/184	W2OW	JA1XFW/336	K2P/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
OE3WQB/102	NY7T/109	W4IS	JA1XFW/337	K2Q/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
VE3TKI/115	W8ZP/104	W4WX	JA1EUB/305	K2R/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
YN1XC/109	KJ9O/105	WB3LHD	JA1TBM/132	K2S/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
KE1ET/106	WE9A/112	WE9A	JA1VTZ/330	K2T/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
KE1GV/117	WE9A/112	WE9A	JA1WZB/337	K2U/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
W1JO/151	10 Meters	12 Meters	JA1XZC/159	K2V/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
N2JX/103	JA1EEG/107	K8IU	JA2DZC/318	K2W/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
N3NY/126	JA1WPX/214	JA1WPX/214	JA2EVOG/334	K2X/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	
NR3PI/119	JA9IFF/120	JA9IFF/120	JA2SOY/155	K2Y/323	JA2ZPS/327	JA2YWN/334	ZS6YQ/364	W5QDU/322	

JAC1CHN/330	JF1UVJ/305	ON4ON/299	AD5A/283	OZ5MJ/218	K4QL/170	K5OVC/282	J12KX/269	WF5E/232	JH1ORA/134
JAC1CLW/242	JF2BNQ/275	OZ5MJ/329	KB5OHT/248	WU1F/133	N4CH/158	K5UR/328	J11SKG/153	W5BPT/151	JH1JSN/312
JAC1DIO/246	JF6OJX/319	SM5HV/H/1K7	KE5PO/302	W1CRL/208	N4SU/270	K5XX/118	J12LPV/156	W5FPI/219	J1CQCA/128
JAC1DUH/306	JF6WBP/290	317	K5AS/335	KF2KF/140	W4UW/141	N5FG/183	JK7KIH/126	W5FKX/118	J1SKG/180
JAC1EOD/333	JG1HND/321	SM7NDX/246	K5HAA/232	NK2H/215	W4VQ/129	N5QDE/116	JM1GAW/113	W5RUK/139	J1JLPV/181
JAC1EPL/153	JG1FSX/330	UU1JA/278	K5JZ/314	WE2K/139	K5UR/279	WA5IPS/111	JM1GYQ/126	W5TUD/118	JK7KIH/129
JAC1FGB/330	JG1TCB/174	VE7EW/172	K5XX/239	WF2S/167	K6EID/163	WF5E/128	JN1MKU/141	OD6WV/296	JL1IHE/203
JAC1FUI/249	JG3NKP/224	7L2VYT/198	WF5E/266	K3QIA/195	K8P18/182	W5BPT/121	JR1RCO/118	K16T/172	JL1TCX/216
JAC1HGY/334	JH1BAM/298	K1DPB/257	W5BPT/301	AA4US/147	<b>80 Meters</b>		W5F1/145	JR4LNG/201	K6EID/311
JAC1HJP/166	JH1BSJ/146	K1ER/282	WF5I/315	K4FJ/309	JA1ADN/129	KD6WV/214	ON4ACG/297	NI6T/271	JR1BYG/142
JAC1IL1/149	JH1GTR/162	K1GW/279	W5FKX/317	K4QL/128	JA1EOD/261	K16T/136	ON4ON/211	N6JM/155	JR1RCQ/128
JAC1IRH/143	JH1ED/142	N1AC/323	W5NX/311	W4VQ/279	J2AAHH/108	K6EID/277	OT3JZ/202	N6JM/155	JR1RCQ/181
JAC1JAT/272	JH1NVR/252	N1CPC/320	W5ZPA/336	KB5GL/308	J2A2PA/261	NI6T/224	UU1JA/132	W6OTC/128	JR4LNG/153
JAC1KNS/299	JH1OTG/168	N1QY/304	KD6WW/321	KE5PO/277	K5JZ/146	J2AQPV/123	K7NN/192	K7NN/250	ON4ON/213
JAC1KRP/180	JH1SJN/317	WA1WMS/225	W5BPT/294	WF5E/184	K2WYNN/269	VE3FRR/134	A6BL/163	OZ5MJ/271	ZS6JHS/140
JAC1MOH/325	JH1XUP/160	WU1F/178	K5KR/323	K4DND/320	AGBL/123	VE3OUP/169	K2BN/215	ZT2DN/203	K1GWP/180
JAC1MZL/254	JH2SON/184	W1TSP/320	K6CU/318	N5FG/195	K8BN/178	K1DPB/155	AA9DX/166	PY3JZ/159	U1UJA/157
JAC1QCA/220	JH2TP1/220	K2RW/319	K6EID/325	N5GGO/311	JD1AMA/216	W28P/123	K1GW/168	KU8A/162	VE3FRR/148
JAC1SGU/313	JH3DTH/298	K2SO/334	K6VL/287	WF5E/188	JE1WZB/120	AA9DX/130	K1UO/233	KU0A/212	ZS6JHS/140
JAC1SJC/302	JI1CQA/253	K2ZZ/311	N1ET/314	WX5L/305	JF1PUW/137	KU0A/122	N1AC/217	KZ0X/192	K1GWP/180
JAC1STF/303	JI1DHY/209	NK2H/132	N6JM/279	W5BPT/173	JH1ORA/140	KZ0X/192	N1QY/241	KZ0M/111	K1UO/218
JAC1VDJ/210	JI1GYC/230	N2CG/138	WD6L/149	W5F1/184	JH3HTD/140	W1TSP/136	N0RR/323	K2ENT/288	N1AC/141
JAC1VN/338	JI1NJC/178	WA2HZO/326	W6FAH/312	KD6WW/196	J12EMF/157	K2ENT/288	10 Meters	WR1X/144	J1W1X/227
JAC1WSX/311	JI1PGO/334	WB2V3/322	W6JJS/221	K6EID/264	J12KX/169	DS5RNM/191	K2RP/280	XC3CE/223	WU1F/185
JAC1WTI/319	JI2FAP/219	WC2C/143	W6OB/255	NI6T/131	JJ2LPV/120	JA1ADN/293	K2SO/271	K2RWP/225	K1EOD/321
JAC1XLU/240	JJ1JGI/156	WE2K/135	W6OTC/282	K7KIH/111	J1EOD/321	K2ZZ/115	JA1ADN/320	KF2XF/155	K2BN/215
JAC2AH2/262	JJ1SKG/192	WF2S/203	KSTP/313	K7NN/196	JM1GYQ/116	J1FUI/126	NK2H/115	JA1BNW/246	K2ENT/285
JAC2CUS/155	JJ2LPV/303	W2RJY/206	KY7M/328	WS7I/289	ON4ACG/264	JAKRWR/159	WA2HZO/275	J1ADIO/315	K2RW/225
JAC2FGL/310	JJ2MST/130	K3IX/332	K7NN/332	NA9DX/290	ON4ON/145	WB2V/171	J1EOD/274	NK2H/158	J1KRW/250
JAC2QCX/321	JK1VSL/127	K3OSX/311	NY7T/223	OZ5MJ/215	JANWHD/311	W2RJY/112	WA2HZO/260	K2WZB/157	WA2HZO/260
JAC5M0O/210	JK7KIH/263	K3QIA/285	WB7CLU/181	<b>Satellite</b>		K3IX/256	J1QCA/153	K3OSX/235	J1SGU/218
JA6LCJ/320	JL1BYZ/149	WA3I/214	WG7A/285	F5ETM/193	JU1JA/110	J1UQP/338	K3IX/256	K3OSX/266	K3OSX/235
JA7AO/308	JL1IHE/184	WB3LHD/257	W7TKS/283	JA1RHR/146	J1W1I/137	K3OSX/266	JA4ZK/222	AA4ZK/222	AA4ZK/222
JAT1C/322	JM1GYQ/280	W3TN/263	AG8L/277	JA1WPX/157	K1UO/218	WB3LHD/146	JA1W1X/227	KD4AD/C/153	JA1W1X/227
JAT7J/323	JM1JV/301	AA4NG/327	K8BN/317	JA2FGL/170	N1AC/219	WB3LHD/146	WB3LHD/146	K4QL/238	WB1F/185
JAT7J/T/270	JN3SAC/299	AA4US/222	AA8DX/288	N1QY/150	J1EOD/321	WB3LHD/146	WB3LHD/146	AD5A/163	WB1F/185
JAT7QK/306	JO1MOS/188	KB4GYT/289	AJ9K/222	K2ENT/273	J1EOD/321	WB3LHD/146	WB3LHD/146	K4VUD/127	WB1F/185
JAC9CGW/246	JO2OUO/161	K4JLD/315	KJ9O/327	J2BWT/114	J1EOD/321	WB3LHD/146	WB3LHD/146	N4AA/197	WB1F/185
JAC9IF/183	JQ1VNMM/170	K4PIC/256	NT9L/312	K2JMY/267	J1EOD/321	WB3LHD/146	WB3LHD/146	N4CH/301	WB1F/185
JAC9IF/183	JQ1VNMM/170	W9BF/314	JR1RCQ/162	K2JMY/267	J1EOD/321	WB3LHD/146	WB3LHD/146	W4USN/135	WB1F/185
JAO0AMN/149	JR1BAS/230	K4QL/316	KJ9O/327	K2RWP/220	J1EOD/321	WB3LHD/146	WB3LHD/146	W4USN/135	WB1F/185
JAO0BJR/299	JR1BYG/159	K4VW/185	KU0A/259	K2RWP/220	J1EOD/321	WB3LHD/146	WB3LHD/146	W4USN/135	WB1F/185
JAO0BKX/324	JR1COZ/144	K4ZIN/259	KZ0X/216	AC4G/144	J1EOD/321	WB3LHD/146	WB3LHD/146	W4USN/135	WB1F/185
JAO0UMV/216	JR1DHN/234	K4ZD/176	N0RR/336	AA4NG/118	J1EOD/321	WB3LHD/146	WB3LHD/146	W4USN/135	WB1F/185
JE1CTA/333	JR1EFG/240	N4AA/230	<b>160 Meters</b>		J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JE1FX/245	JR1FXPS/174	N4CH/319	RTTY	K4QL/251	J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JE1PNX/236	JR1XIS/330	N4DV/326	J1EOD/276	K4ZIN/151	J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JE1REU/280	JR2BWNF/317	N4VN/170	JA1FGB/189	K4ZLJ/133	J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JE1VTZ/274	JR5VHU/230	WD4KMW/266	JA1HGY/251	K4ZAO/167	J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JE20VGG/330	OE1TKW/282	W4IS/176	JA1KRN/144	K4ZCH/133	J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JE2S0YV/155	OE2BZL/228	W4OGG/156	JA2FGL/237	K4ZCQ/165	J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JF1PUW/333	OK2SW/283	W4USN/225	JA1VTZ/139	ON4ACG/215	J1EOD/321	WB3LHD/146	WB3LHD/146	WB3LHD/146	WB1F/185
JF1SEK/335	ON4ACG/307	W4UW/284	JF2BNG/182	OZ5MJ/122	AD5A/115	J1EOD/321	WB3LHD/146	WB3LHD/146	WB1F/185
			JH1ORA/222	W20KM/256	K5AS/110	J1EOD/321	WB3LHD/146	WB3LHD/146	WB1F/185
				K2RJX/152	K5IZ/144	J1EOD/321	WB3LHD/146	WB3LHD/146	WB1F/185

## New Products

## RG303/U CABLE ASSEMBLIES FROM CABLE X-PERTS

◊ Two RG303/U 50- $\Omega$  coaxial cable assemblies (6 feet and 18 feet long, respectively) are now available from Cable X-perts. Both feature PL-259 connectors at each end, which are soldered and tested for RF and mechanical integrity. Longer lengths and bulk spools are also available.

RG303/U is a high-temperature, high-power teflon coax with a solid silver center conductor and a mil-spec silver braid shield. It's rated for 6 kW PEP (1.9 dB loss per 100 feet at 30 MHz).

Prices: 6-foot assembly, \$14.95; 18-foot assembly, \$24.95, plus \$6.75 for USA shipping (lower 48). For more information, contact Cable X-perts, 416 Diens Dr, Wheeling, IL 60090; tel 800-828-3340, fax 847-520-3444, e-mail [exp@ix.netcom.com](mailto:exp@ix.netcom.com); <http://www.cablexperts.com>.

## DAVIS INSTRUMENTS

◊ Davis Instruments, a manufacturer of

weather instrumentation systems since 1988, announces the availability of *Weatherlink 4 for Windows*, which gives ham operators new tools and features for working with Davis Home Weather Stations, including improved support for packet radio.

New features include automatically updated strip charts, automatically generated NOAA-type "weather watcher" reports, an improved plotting interface, calculated weather data that's not available on the Weather Station's electronic console, support for the Automatic Packet Reporting System (APRS), and more.

Weatherlink 4 works with IBM-compatible systems running *Windows 3.x*, *Windows 95* and *Windows NT 4.0*. Prices: Complete package, \$165; Upgrades for existing users, \$49. For more information, contact Davis Instruments, 3465 Diablo Ave, Hayward, CA 94545; tel 510-732-9229, fax 510-732-9188; **http://www.davisnet.com**.

**WEATHER SERVICE "SPECIFIC  
AREA MESSAGE" DECODER FROM  
MORRIS SOFTRONICS**

- ◊ The National Weather Specific Area Message Decoder (NWSAMD) allows users to decode Specific Area Message Encoding (SAME) data from the voice channel of any 160-MHz weather service receiver. The device is microprocessor-controlled and is configured via its RS-232 serial port. Configuration data is stored in non-volatile memory.

Designed primarily for Skywarn, ARES and repeater service for retransmitting NWS bulletins and information, the NWSAMD provides switched audio, PTT and control inputs/outputs. The factory assembled PC-board module is powered by 8 to 16 V dc and comes with a detailed user guide.

Price: \$149.95. For more information, contact Morris Softronics, Box 48, Hooper, NE 68031; tel 402-654-2482, e-mail [msftrncs@htcnet.com](mailto:msftrncs@htcnet.com); <http://www.htcnet.com/msftrncs>.

Rick Palm, K1CE • Field Services Manager

# Hospital Emergency Communications— Fulfilling the Mission

By April Moell, WA6OPS  
PO Box 2508  
Fullerton, CA 92837-0508  
e-mail: EmCom4Hosp@aol.com

With the development of new commercial communication products, there has been increasing discussion of new missions for Amateur Radio. An important mission exists for our service that isn't new, but is unfulfilled. Many ARES or RACES groups, when asked, would say they support local hospitals. However, that support is usually poorly planned at best.

Often, the only support hams provide is telling hospitals what ham equipment to install. Then they simply wait for someone to tell them to go to the hospital in a disaster. As a result, hospitals don't realize that hams can help in other communications emergencies, such as isolated phone outages. And hospitals become an afterthought when an area-wide disaster hits.

Hospitals are vital organs in every community. Because of their important role in day to day, not to mention in area-wide emergencies, they should have the highest priority for communications support. Even though hospitals have emergency phones, pay phones, cell phones, and walkie talkies, none can fully replace the main telephone system. Ham operators can support communications from unit to unit in a hospital and link the hospital to the outside world.

Mass casualty incidents and area-wide disasters are not the only situations in which back-up communications are needed for hospitals. Any telephone system failure in a hospital is a disaster too. The potential for serious consequences to patients is high. When patient care is at stake, hospitals need every resource possible. Amateur Radio can be a vital resource, provided that hams prepare and plan thoroughly.

Thus the mission: supporting communications that are critical to patient care.

## A Working Model

Since 1980, the Hospital Disaster Support Communication System (HDSCS) has provided communications backup to hospitals in Orange County, California. Interest started with one hospital; now 36 facilities are supported. Each facility has formally requested the involvement of Amateur Radio.

HDSCS is a special ARES group. Operating under ARES frees us to interface

directly with private and public hospitals at all times. It is important to be able to respond to hospitals individually when they request and to self-dispatch in accordance with designated plans in an area-wide emergency. There are no intermediaries under ARES. HDSCS has a memorandum of understanding with Orange County RACES for occasions when hospital emergency communication to and from government entities are required.

HDSCS has two components. The *Call-Up* system activates members for phone outages and mass casualty incidents. The *Core Team* system is a mechanism by which members self-dispatch to nearby hospitals in area-wide emergencies.

Hospitals activate a call-up responder on their list when a communications problem occurs. A group page number is also provided for hospitals to use if calls are unanswered or there are limited opportunities to make calls. The first HDSCS operator contacted takes over, putting the system in motion to rapidly get responders to the hospital.

Core Teams are made up of individuals who have committed to respond to assigned hospitals without first being called when a major area-wide disaster strikes. Core Team responders do not take on assignments from other ARES/RACES groups that they belong to unless cleared from HDSCS first.

## Keys to Success

Since 1980, HDSCS has responded to 60 hospital communication emergencies. The group is recognized in the county's Mass Casualty Medical Response Plan. We are members of the three hospital disaster drill planning committees and also participate in the county's Disaster Advisory Group. This level of acceptance didn't just happen; we earned it. Several factors led to this degree of credibility and success. Some are:

**1. Preparedness.** HDSCS hams are ready to respond from home, from work, and when on the road. There's no time to rummage through the shack to figure out what to take. Whether or not the hospitals in need have external antennas or radio gear doesn't matter; HDSCS hams prepare as if there will be none. We have often had to do communications from unit to unit, using our own portable gear and flexible capabilities.

**2. Consistency.** Many members have been with the group for more than 10 years. Four coordinators have been involved since the beginning. Many hospitals know our responders by name, and the committees we attend know us too. As a result, the hospitals keep us in mind. That leads to being called out, not just in emergencies, but for stand-by operations when phone systems are being upgraded, and for public service activities like hospital-sponsored 10-K runs.

**3. Training.** Members of HDSCS learn about the unique communication needs of hospitals. Meeting programs feature presentations on county emergency medical services, hospital departments, procedures and much more. We drill with each hospital at least once a year, testing the activation procedures as well as our communication links.

**4. Multiple channels.** One repeater or simplex frequency for hospital communications is not enough in most scenarios. Alternates are needed for high traffic levels and when primary repeaters are inoperable or unavailable. Autopatch capability is a plus. Patches have been vital in several phone outages. At one point during a 1996 response following a switch-gear failure, traffic was being relayed out on the main net frequency, an internal unit-to-unit net was in progress on simplex, and urgent calls were being made from the Emergency Department and Intensive Care Unit via autopatch on two different repeaters.

**5. Reliable tactical voice communications.** Over 99% of our inter-hospital and intra-hospital communications are short, point-to-point tactical messages. Many involve contacting physicians and staff, both inside and outside the facility. Requests for supplies, whether within the hospital or to an outside source, have almost always been for less than three items. On many occasions, we give the microphone to a hospital staff member for third-party communications. Packet radio and ATV may be exciting modes, but when it comes to supporting hospitals, voice communications are what is needed.

## Making a Difference

To date, HDSCS has responded 179 times to Orange County hospitals. Sixty of these have been emergency callouts for phone failures and activations for earth-



Jean Creason, KC6PPY (standing), assists the Incident Commander at a hospital command post during a mass casualty drill.

quakes, flooding and fires. The remainder have been stand-by operations and drills.

By making the effort to learn, prepare, drill and respond, we have made a difference—a difference that has positively affected people's lives. Our emergency messages have included orders for blood, a "stat" (immediate) request for medication from the Neonatal Intensive Care Unit to the Pharmacy, an urgent call for a physician to assist in an emergency Cesarean section, and a call for priority response from the power company to a hospital when its emergency generator failed after an earthquake.

The bottom line is patient care. In Orange County, Amateur Radio plays an important role.

#### HURRICANE WATCH NET HOME PAGE UP

The Hurricane Watch Net home page is up and running at <http://www.weathernode.com/hwn/>

The page provides current hurricane advisory information. Advisories are downloaded directly from the GOES satellite via the EMWIN/Weathernode system. Current data will be available on the page within seconds of it being transmitted from the National Hurricane Center in Miami. Suggestions and comments are welcome.

Thanks to Jerry Johnson, WA3WZF, President of Maryland Radio, for donating the server space for the page and for production assistance. Thanks also to Jim Doherty, N3KJH, of the National Weather Service EMWIN project.—*Jerry Herman, N3BDW, Hurricane Watch Net Manager*

#### HAM HUMANITARIANS AT WISCONSIN SPECIAL OLYMPICS

By Joe Larson, N9JW

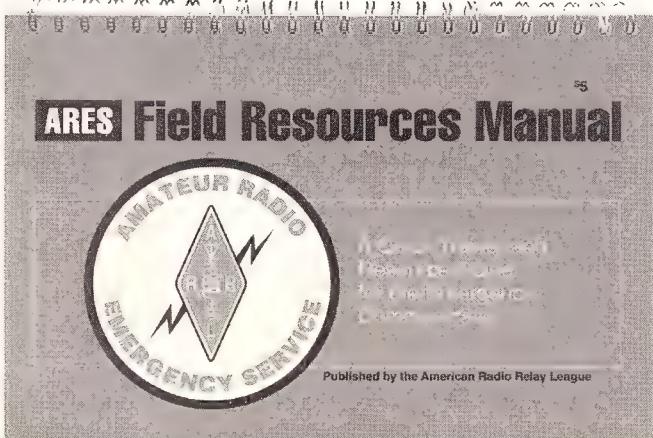
The man was sitting down in Tournament Central, holding a hand over his face. He was crying. A track volunteer had her arm around him. "Don't worry, Roger, we'll find your coach."

Roger Trent was 60 years old, with wispy gray hair. He had become separated

#### Great Gift Idea: The ARES Field Resources Manual

The *ARES Field Resources Manual* has been a big hit among the rank-and-file ARES community. This manual is intended to serve as a quick trainer and reference for amateurs involved in emergency services work, primarily through the Amateur Radio Emergency Service (ARES) in their communities. It provides basic program information on ARES and

RACES, forms, operating aids, and templates to be customized for the local area to include reference information such as important phone numbers, emergency frequencies, maps, organizational details, and so forth. It would make a nice gift for your favorite emergency communicator this holiday season. \$5 plus shipping. All ARRL publications are available from your local ARRL dealer or directly from ARRL. Mail orders to Publication Sales Dept, ARRL, 225 Main St, Newington, CT 06111-1494. You can call toll-free at 888-277-5289; fax your order to 860-594-0303; or send e-mail to [pubsales@arrl.org](mailto:pubsales@arrl.org). Check out the full ARRL publications line on the World Wide Web at <http://www.arrl.org/catalog>.



from his coach in the crowd at the Wisconsin Special Olympics summer games in Stevens Point. He knew he was supposed to compete in the 100-meter walk at 2 PM, and he told a volunteer about it. The volunteers know that they can bring lost athletes to the ham radio operators at Tournament Central, so she brought Roger to us.

"What is your coach's name, Roger?" Judy, one of the hams, asked. "I don't remember," replied Roger in a quivery voice. "Well, that's okay. Let's just get your agency number and look her up." She patted his shoulder.

Pat, the other ham operator, picked up a microphone. "Track Announcer, this is Tournament Central."

After a couple of seconds, Peter, the ham operator stationed near the track public address system, boomed back, "Track PA here."

"Peter, please have them announce that a coach from agency 9-22 should come down to Tournament Central and pick up an athlete, Roger Trent."

"Okay, will do."

It was almost 2 o'clock and Roger was going to miss his event.

Two thousand adults and children, all with developmental disabilities, participate in the Wisconsin State Special Olympics summer games, which are held on campus at the University of Wisconsin-Stevens Point in June each year. The athletes have to qualify in regional and sectional meets to make it to the state competition. Many of them train year round in their events; all of them work hard for months to make it. Missing an event is a disaster.

With family, friends, coaches, and volunteers, over 6000 people are on campus during the games. Many of them are strangers to the campus and to the city. Central Wisconsin hams come out every year to help coordinate communications among the event venues, to keep volunteer medical staff connected, and to help unite lost and found coaches and athletes. We help the games run smoothly.

It was my turn to roam around the campus with my hand-held radio. Our distinctive yellow shirts say "Amateur Radio Emergency Communications" on the back, so people stop us with questions, ask for directions, and show us their medals. I left Roger with Pat and Judy and headed out of Tournament Central and into the hot, sunny day.

Walking the crowded campus, I heard the PA, "Will Roger Trent please report to the yellow staging area immediately." I jerked my head up. Then I grabbed my microphone.

"Tournament Central, this is N9JW."

"Go ahead, Joe."

"I just heard Yellow Staging announce that Roger Trent is to report there immediately."

"Thank you very much!"

Judy told me later that Roger got to his event on time. Afterward, he had his coach bring him back down to Tournament Central to thank us. Beaming with pride, he said, "You helped me get this medal. You are the greatest. If I ever get lost again I am going to come right back here!" The sunlight through the windows flashed off the shiny silver disc as he turned it so we could all see.

# Field Organization Reports

## September 1997

### Section Emergency Coordinator Reports

There are 40,367 ARES members accounted for in SEC records. The following section emergency coordinators reported: AL, CT, ENY, GA, ID, IN, KY, MDC, MI, MN, NFL, NC, NV, TN, VA, VT, WMA, WNY, WV.

### National Traffic System

Net	Sess	Tfc	Avg	Rate	% Rep	% Rep to Area
-----	------	-----	-----	------	-------	---------------

#### Cycle 2 Area Nets

EAN	30	669	22.30	0.590	89.0
CAN	30	359	12.00	0.440	93.3
PAN*	60	360	6.00	0.340	91.7

#### Region Nets

1RN	60	803	13.38	0.732	98.0	100.0
2RN	30	289	9.63	0.469	94.4	96.7
3RN	30	125	4.16	0.370	100.0	96.7
4RN	60	201	3.35	0.240	72.0	96.7
RN5	60	571	9.51	0.607	92.0	100.0
RN6	31	39	1.26	0.202	82.0	93.3
RN7	60	406	6.76	0.350	69.7	100.0
RN8	60	193	3.21	0.334	100.0	100.0
RN9						100.0
TEN	60	516	8.60	0.580	52.0	100.0
TWN	43	96	2.23	0.340	69.0	81.6
ECN						46.7

RN6 HF Digital mailbox traffic: 207.

#### Cycle 3 Area Net

EAN	30	150	5.00	0.364	77.1
-----	----	-----	------	-------	------

#### Region Nets

1RN	30	63	2.10	0.279	95.2	93.3
2RN	30	64	2.13	0.358	98.9	96.6
3RN						50.0
4RN						86.6
8RN						96.6

#### Cycle 4 Area Nets

EAN	30	805	26.83	0.194	95.7
CAN	30	377	12.57	0.754	100.0
PAN	30	468	15.60	0.662	88.9

#### Region Nets

1RN	59	246	4.17	0.464	96.4	100.0
2RN	52	153	2.94	0.440	96.0	100.0
3RN	51	129	2.53	0.270	78.3	93.3
4RN	60	550	9.16	0.574	78.0	100.0
RN5	30	343	11.43	0.620	89.2	100.0
RN6	60	256	4.27	0.650	77.5	100.0
RN7	60	386	6.43	0.504	98.6	100.0
8RN	57	203	3.56	0.280	92.0	96.6
9RN	60	209	3.48	0.480	97.0	100.0
TEN	60	265	4.42	0.420	75.8	100.0
TWN						66.7
ECN	31	186	6.00	0.588	72.0	93.3
ARN	30	31	1.03	0.035		86.6

\*PAN operates both Cycles 1 and 2.

ARRL Section Traffic Managers reported: AL, AR, AZ, CT, DE, EBAY, ENY, EPA, EW, GA, IA, ID, IL, IN, KY, MDC, MI, MN, NC, NFL, NH, NLI, NNU, NTX, OH, OR, ORG, OK, SBAR, SC, SD, SDG, SF, SFL, SNJ, STX, TN, VA, WI, WMA, WNY, VA, WPA, WV, WWA.

### Transcontinental Corps

Area	Successful Functions	% Successful	TCC Function Traffic	Total Traffic
------	----------------------	--------------	----------------------	---------------

#### Cycle 2

TCC Eastern	93	77.50	238	490
TCC Central	115	95.80	286	290
TCC Pacific	104	86.67	249	404

#### Cycle 3

TCC Eastern	28	100.00	n/a	30
-------------	----	--------	-----	----

#### Cycle 4

TCC Eastern	102	97.14	187	712
TCC Central	50	83.30	98	208
TCC Pacific	104	87.00	332	682

NTS Digital Traffic Total: 4868

### TCC Roster

Eastern Area, Cycle 2: KW1U, Director. N1DHT W1FYR KF1 N1OTC KT1Q KW1U W2FR W12G KA2GJV N2LTC W2MTA KA2VZX N2XJ KA2YZM N3DRM N3EFW KK3F N4ABM AAA4AT W4XH K4MTX N4SS WD8LDY K8TPF WD8V KA8WNO WB8YDZ.

Eastern Area, Cycle 3: W2FR, Director. N1OTC W2FR W3OKN AA4AT WD8LDY K8TPF KA8WNO.

Eastern Area, Cycle 4: W2FR, Director. KF1L KW1U KT1Q N1FT N1OTC W1CE W1FYR W1INJ KA2GJV KA2VZX N2JAW N2LTC W2CS W2FR W2GKZ W2MTA W2RQKK3F N3COR N3DRM K4SCL K4WJR N4GHI N4SS W4UQ WB4KSG K5TF N6ANQ K8TPF KA8WNO W8JWX W8PMJ W8UQ WB8YDZ WD8V VE3AWE.

Central Area, Cycle 2: N0FBW, Director. W5JDF (SK), N5IKN W5KLW K5MXQ W5QFU KS5V W5YQZ KE5ZV W6IVV N0FBW W0FE WB0WNJ.

Central Area, Cycle 4: K5GM, Director. K5GM K5MC K5RG W5TFB K5SW K5BW N9CK W9FC K9PUI WA9QCF N0SM.

Pacific Area, Cycle 2: KT6A, Director. KT6A W6DOB N6GIW K7BDU K7VVC KA7YYR.

Pacific Area, Cycle 4: W7GB, Director. W6EOT W6QZ W6VZT K6YR WA7EES KA7EKL W7EP W7GB W7GHT KB7GZU N9TH W7LG W7VSE W7ZI W0EZ K0TER VE7CTW VE7DWG.

NTS Digital stations: W1FYR WB2FTX N2JAW N2LTC AD4DO W4EAT K04ET W4XJ W4KAU N4SS K5DPG K5MXQ N5NAV W5NRJ KK5QT N5TUK KS5V W5YQZ WB5ZED N6GIW W6QZ N9ANL W9CBE N0FBW N0ZD VE3BDM.

### Public Service Honor Roll

This listing is to recognize amateurs whose public service performance during the month indicated qualifies for 70 or more total points in the following 8 categories (as reported to their Section Managers). Please note the maximum points for each category: 1) Checking into a public service net, using any mode, 1 point each; maximum 60. 2) Performing as Net Control Station (NCS) for a public service net, using any mode, 3 points each; maximum 24. 3) Performing assigned liaison between public service nets, 3 points each; maximum 24. 4) Delivering a formal message to a third party, 1 point each; no limit. 5) Originating a formal message from a third party, 1 point each; no limit. 6) Serving as an ARRL field appointee or Section Manager, 10 points each appointment; maximum 30. 7) Participating in a communications network for a public service event, 10 points each event; no limit. 8) Providing and maintaining an automated digital system that handles ARRL radiogram-formatted messages; 30 points. Stations that qualify for PSHR 12 consecutive months, or 18 out of a 24-month period, will be awarded a certificate from HQ upon written notification of qualifying months to the Public Service Branch at HQ.

113	106	KG7LS	AE4WP	KD4TQN
W1ALE	KE4NAY	K3UWO	89	N8TXL
KB5UCQ	KA7TYY	KA4LRM	WR8F	AB5RV
112	96	87	78	N4JTG
AG9G	105	KE6GFV	WA1QAA	KR4ZO
WA8DHB	K54FB	KI0JO	KB2GEK	K1SEC
KC5QZZ	104	KF1L	W4DLZ	
WB2EAG	KB9ENO	W2PII	K1FP	
	WA0TFC	KD4JMV	KF4BDY	
111	K9GBR	KD4FUN	W0MZI	
KB1AF	KN4OH	KE4YEW	KD4HGU	76
N1SGL	W7NWP	W4XI	WA5FXQ	N5BMB
	AA9HN	KC5PNM	84	K8SH
W2MTO	103	K4VIA	75	
N3RB	KE6MIW	KE4PAP	K4BEH	
KF4DUS	102	KB4WBY	N3WKE	W4NTI
K3FEL	W4PIM	WA4GLS	N8TDE	
KC5VNC	AA2NX	K2DBD	K7MQF	K8SH
KG5GE	K8ZJU	WB2JH	KB2ETO	N2ZMZ
109	KE4DNO	93	N2JRS	KC5EZK
WA2CUW	KD4DW	K4AIF	N1TDF	WY3K
WA4QAT	KC6SKK	W2AZ	KA1VAX	
WB8KWD	101	KD4JMA	KA1OTN	KE4RLL
WA8SS1	KO4QL	WA6DQK	WA4EYU	W7UVP
N8DD	KD6YJB	N6GIW	KK5WG	WB5CXK
KB2KOJ	100	K5MC	82	
KB8ROA	KB2UQZ	91	81	
N7YSS	K0IBS	W2CC	70	
KT4S	K5AO	KA8MPD	80	N2SOE
K0ERM	90	KA0DBK	KB2YBM	
KA1WCD	98	WB2CZW	KB2VSR	
WB5YDD	KF4NFP	97	K4CD	N1ZFF
	KA9FVX			

The following stations qualified for PSHR during the month of August, but was not listed in the column in last month's issue: N1VXP 139, N3WKE 91.

### Brass Pounders League

The BPL is open to all amateurs in the US, Canada and US possessions who report to their SMs a total of 500 points or a sum of 100 or more origination and delivery points for any calendar month. All messages must be handled on amateur frequencies within 48 hours of receipt in standard ARRL radiogram format.

Call	Orig	Rcvd	Sent	Dlvrd	Total
NM1K	790	533	1135	43	2501
W1FYR	0	784	794	2	1580
N2LTC	0	434	569	1	1004
WB0WNJ	0	396	599	5	1000
WX4H	2	389	434	15	840
KA2VZX	54	315	340	120	829
K9JPS	3	432	42	312	789
W9IHW	3	457	31	288	779
K7BDU	53	289	365	7	734
WB9JSW	0	395	39	280	714
WA9VND	9	351	319	21	700
KA1VEC	22	311	335	31	699
K7VVC	21	281	301	66	669
W3VR	264	190	210	21	685
W9RCW	0	306	148	189	643
W1PEX	1	512	126	2	641
N5IKN	0	300	76	226	602
AA2CX	12	158	373	48	591
W3CUL	210	98	260	20	588
W6DOB	33	189	294	66	582
KT1Q	0	279	276	10	565
K1EIC	0	268	268	7	543
KT6A	2	270	233	4	509
KA2YZM	24	285	177	22	508
W3KOD	0	286	216	2	504

BPL for 100 or more originations plus deliveries: KI5QZ 223, KK5QT 140, KC5OZT 124, K4SCL 117.

### Independent Nets

Net Name	Sess	Tfc	Check-ins
Amateur Radio Telegraph Society	30	224	440
Amateur Radio Telegraph Society (20M)	30	4	121
Bears of Manchester	30	401	290
Central Gulf Coast Hurricane Net	30	35	2067
Clearing House Net	27	38	211
Empire Slow Speed Net	30	141	334
Hit and Bounce Net	30	294	597
Hit and Bounce Slow Net	30	126	459
IMRA	26	442	1201
Midwest RTTY Net	30	142	278
Mission Trail Net	30	80	877
Pennsylvania Phone Net	30	102	288
Southwest Traffic Net	30	62	1089
Sunbelt Service Net	23	48	2272
West Coast Net	30	43	232
75 Meter ISBN	30	81	827

## Worldwide Propagation on 6 Meters?

Since early autumn, it has become clear that the sun has awakened from its slumber and has begun to reenergize our ionosphere. Ten meters was open on many days in late September and early October from the US to South America, Africa, the Pacific, and even to Europe. Six meters began to show some life of its own with an upsurge in transequatorial activity, including contacts from Florida to Argentina. Can true 6-meter F-layer DX be far behind?

### The New Cycle

It is still too early to place a definitive date on the birth of Cycle 23, but evidently it has been underway for more than a year now. The Space Environment Center of the National Oceanic and Atmospheric Administration (SEC/NOAA), the premier research center for solar and atmospheric physics, provides two indicators of the solar minimum. According to the number of sunspots, the minimum occurred in May 1996. The lowest part of the cycle according to the longest stretch of days on which there were no sunspots was in October 1996. The final determination is yet to be made, yet it is clear the minimum has passed.

Predicting the behavior of the new Cycle 23, including the peak date and maximum smoothed sunspot number (or 10.7 cm solar flux), is not easy. There are at least six different prediction methods, but most rely on analysis of previous cycles. The methods that have proved most accurate in the past suggest that the peak of Cycle 23 will be about as great as Cycle 22, which was the third highest on record. One analysis, which takes into account that odd-numbered cycles have been larger than the immediate preceding cycles, suggests that Cycle 23 will exceed Cycle 22 and could be the highest ever.

SEC's official prediction for Cycle 23 is shown in Figure 1. It indicates a peak smoothed solar flux of about 210 occurring in mid-2000. (In comparison, Cycle 22 had a double peak and a maximum smoothed flux also about 210.) If these predictions for Cycle 23 prove accurate, they suggest that worldwide propagation on 28 and 50 MHz should be at least as good as it was 10 years ago. So when will we start hearing worldwide propagation on 6 meters?

\*Send reports to Emil Pocock, Box 100, Lebanon, CT 06249. Leave voice messages at 860-642-4347, or fax 860-594-0259 or e-mail [w3ep@arrl.org](mailto:w3ep@arrl.org).

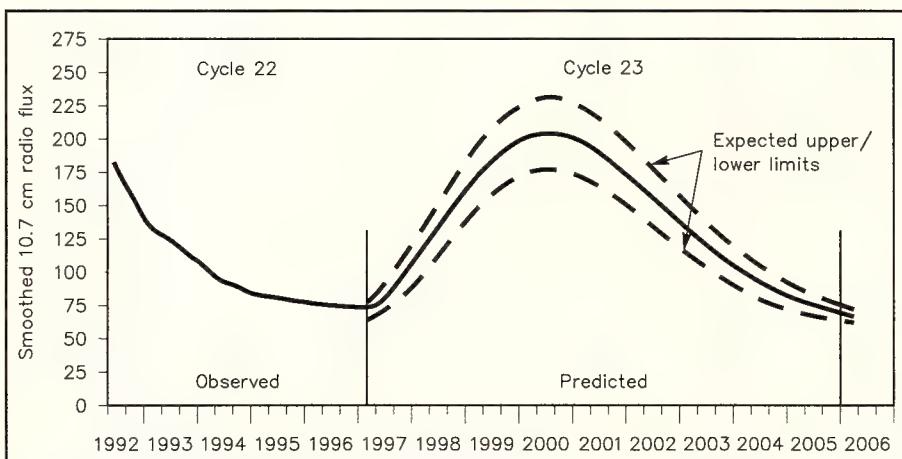


Figure 1—Prediction of the smoothed 10.7 cm flux for Cycle 23 was published by the Space Environment Center of the National Oceanic and Atmospheric Administration in June 1997.

### Solar Flux and 6-Meter DX

There is no one-to-one correspondence between solar flux, even the daily flux value, and the MUF (maximum usable frequency) over any path. It is a more complicated matter because many variables are involved. Time of year, signal path, daily solar flux, condition of the geomagnetic field, and operating conditions—including transmitter power, antenna, and local noise all play a role. Sophisticated computer propagation prediction programs take into account these variables, but unfortunately most break down when attempting to predict an MUF as high as 50 MHz.

Even so, there are some general guidelines that can aid in anticipating conditions on 50 MHz. Six meters opens for worldwide DX primarily between October and May, with the best conditions in December and January. The daily flux must be high, perhaps 125 or greater even for the easiest paths, such as the US to South America. The daily flux must exceed 200 just for a 50-50 chance of propagation between the East Coast and Europe, although it has been open with the flux as low as 130. More difficult northerly paths, like the East Coast to Japan, require even higher flux levels.

The highest daily MUF is generally ob-

served just after noon at mid-path. Thus, 6-meter propagation between the US and Europe usually occurs only for a few hours during the late mornings. Openings over the easier path from the US to South America generally last the longest, sometimes extending from mid-morning to late-afternoon. Openings across the continent take place around noon, and those from the US to the Pacific are afternoon events. Conditions deteriorate over most paths when the geomagnetic field is at storm levels (A index above 30 or K index 4 or higher), whatever the solar flux.

Solar flux, in other words, provides a general indication, but it is also necessary to keep in mind season, time of day, and specific paths. Study the propagation charts published each month in the "How's DX?" column to find the times for the peak MUF over any particular path. Although the charts may not show the MUF actually reaching 50 MHz, the times will accurately show when this is most likely.

### What Can We Expect Next?

There is a sequence of 6-meter propagation events that can help gauge the general progress of the solar cycle. The first indication is an increase in transequatorial (TE) contacts on 50 MHz. TE is a special F-layer phenomenon that supports contacts up to 8000 km perpendicular to, and equidistant from, either side of the geomagnetic equator. The most common TE contacts from the southern US, adjacent Mexico and the Caribbean are with Argentina, Uruguay,

#### This Month

December 6-7	Good EME conditions
December 13	Geminids Meteor Shower Peaks

and Chile. TE appears most commonly during the fall and spring equinoxes and may be enhanced by geomagnetic storms. TE has already picked up considerably this past fall. Read the "On the Bands" section below for reports of phenomenal TE activity this September.

The first signs of true F-layer propagation will be contacts that cross the regions of highest F-layer ionization, which form around noon in two thick bands  $15^{\circ}$  or so either side of the geomagnetic equator. Thus, the first F-layer contacts from the US are likely to be to the northern part of South America, to South Africa, and to Australia. Contacts in other parts of the world that also cross the equatorial regions are likely to appear in the early reports. The daily solar flux requirements for these paths are quite modest—perhaps as low as 125 to 150. The latest SEC predictions suggest that some daily solar flux values should reach this range by the fall of 1998.

As F-layer ionization increases, it becomes possible to complete contacts at more northerly latitudes. The next most likely paths will be from the East Coast to Europe and the East Coast to West Coast. The daily solar flux normally required for these contacts is at least 150 to 175. Such values might occur during the winter of 1998-99, but it is more probable the following year. The most difficult contacts are those that cross even higher latitudes, such as the East Coast to Japan and the West Coast to Europe. Flux requirements are even greater and may have to wait until the peak of the cycle, predicted for the year 2000.

## Comparison with Cycle 22

Another way to gauge the progress of 50-MHz propagation is to compare actual conditions during Cycle 22 with the predictions for Cycle 23. The first widespread openings from the US to Europe and from coast to coast during Cycle 22 occurred in December 1988. The smoothed 10.7 cm radio flux had barely reached 125 at the time (but some daily values reached 150 and higher). According to the SEC prediction for Cycle 23, the smoothed 10.7 flux will reach that same level as early as mid-1998. This analysis suggests that some worldwide DX could be possible by next fall and winter.

Truly spectacular worldwide openings took place in the fall of 1989, when the smoothed solar flux was above 175 and some daily flux values exceeded 200. Six meters was open to Europe two days out of three from November 1989 to January 1990, and there were a number of openings from the US to Japan and the Pacific islands. The equivalent position for Cycle 23 is predicted for late 1999.

Long-range forecasts provide only a framework for anticipating what might be possible. The best way to discover openings on 50 MHz is to monitor the radio daily

and follow the MUF up from 28 MHz. You may want to chart your own receptions against daily solar flux and geomagnetic indicators. Several WWW sites also provide near real-time satellite data, including actual X-ray levels. There is also a site that provides a real-time MUF contour map, which might prove useful for watching the MUF approach 50 MHz. You'll find the map at <http://solar.uleth.ca/solar/www/realtimemap.html>.

Nothing is certain, but several predictions indicate that there will be some good possibilities for real 6-meter DX by late fall next year. Stay tuned!

## ON THE BANDS

The big activity stories of the month were the exceptional tropospheric openings that affected much of the eastern half of the country and the many days with transequatorial propagation on 50 MHz around the world. Dates and times are UTC.

### Ducting

Tropospheric conditions were quite exceptional throughout the Mississippi and Ohio valleys during September, as a series of sluggish high-pressure systems moved across the country. Most of the reported contacts were on 144 MHz, but ducting supported contacts nearly as distant up to 1296 MHz. The activity summarized below was all on 144 MHz unless otherwise noted. Thanks to KH2CY/4, K4MSG, W4UE, AA9AO, NA9N, KW0A, KD0PY, and W0PHD whose reports also contributed to these summaries.

The opening of September 3 and 4 extended from northern Georgia to Kansas and north to the Canadian border. Andrew Kozlowski, VE3JJX (EN29), worked south through Iowa, Missouri, and Oklahoma. His longest contact was with W0PW (EM26), at around 1450 km. Arliss Thompson, W7XU0 (EN13), worked widely from Ohio (EN80) to the east, south to Georgia (EM74) for his longest contact with KA2KQM/4, and southwest to the Texas panhandle (DM11).

Good tropo conditions were on hand for the VHF contest, September 14-15, over an area extending from Minnesota and eastern South Dakota, south to Kansas and Missouri, and east to Ohio and Michigan. Jon Jones, N0JK (EM18), found very strong 144-MHz stations from the twin-cities area of Minnesota and worked N0QJM (EN13) on 1296 MHz.

Widespread ducting covered large areas of the eastern half of the country between September 19 and 22. Russ Holshouser, K4QI (FM06), worked a remarkably wide area on 144 to 1296 MHz. His contacts ranged north to New Hampshire (FN43), west to Iowa (EN31) and Missouri (EM38), and south to Florida (EL97). Russ's longest contacts were in the 1300-km range. During the same period, Chris Vincent, KB4OGM (EL49), found conditions good on 2 meters all along the Gulf Coast from EL88 and EL89 in Florida west to Texas grids EM00 and EM11.

Extraordinary ducting reappeared on September 25. K2SMN (FN20) in New Jersey found many stations from Ohio to Missouri, Iowa, and South Dakota. His best contact with W0SD (EN13) was about 1850 km, one of the longest contacts of the evening. W0SD thought the opening was the best tropo event he had heard in many years from South Dakota. He worked stations as far as western New York and western North Carolina. His longest contact was with W3OID (FM28) in Delaware at about 1925 km. Darryl

Petersen, KD0PY (EN41) in Iowa, made many contacts as far east as New Jersey, Pennsylvania and Maryland grids FN20, FM29 and FM19 on 144 and 432 MHz. Further south, Robert McGraw, K4TAX (EM75) in southwestern Tennessee, worked westward to Oklahoma and north Texas over paths up to 1250 km.

Some of the longest tropo contacts of the month came during the opening of September 26 to 28. Sam Whitley, K5SW (EM25) in eastern Oklahoma, worked progressively to the northeast during those three days. On September 26, Sam had made it north to EN13 and west to EM75 in east Tennessee. The following evening, he extended his range to EN34 in Minnesota, EN53 Wisconsin and EM89 Ohio. By September 28, Sam was working into western New York grids FN02, 03, and 11 at distances up to 1700 km. He worked VE3AX (FN02) and VA3ST (FN03) on 222 and 432 MHz as well as 144 MHz.

By the third day, the opening had extended as far as southern New England, enabling Ron Klimas, WZ1V, and Del Schier, KD1DU (both FN31) to work west as far as Kansas. WZ1V worked W0JRP (EM27) for his best DX on 2 meters at about 1950 km. KD1DU also found W0JRP and N0QXC (EM27) along with WD0BBU (EM28). These are some of the longest tropo contacts made between New England and the Midwest in a long time.

## 50-MHz Transequatorial

The fall and spring equinox periods are prime for transequatorial field-aligned irregularities—TE for short. This unique F-layer phenomenon creates 5000 to 8000 km paths across the geomagnetic equator. The effective MUF for these contacts is much greater than the normal F-layer. As the solar cycle begins its upward swing, TE becomes more intense, allowing contacts on 50 MHz and even higher. True TE can be worked from as far north as the lower tier of the United States into Argentina and Chile. TE-to-sporadic-E links can create longer paths.

The number of TE reports for September was overwhelming, thanks to CO2KK, CO2OJ, JA1VOK, LU6DRV, PY2NI, VK3OT, WB2QLP, WP4O, and Internet Six News. Contacts were reported over each of the common TE paths: southern Europe and the Middle East to south Africa; the Caribbean and Central America to South America; and Japan to Australia. The only reported TE contacts from the US came on September 30, when WB2QLP (EL96) and possibly other stations in south Florida had QSOs with CX4AAJ, PY3PT, and PY5CC.

Good TE conditions have continued into October, with the addition of some apparently true F-layer contacts on 6 meters. More about that next month. Here are the September summaries. Virtually all contacts were made during late afternoon and early evening, local time.

## 50-MHz TE Contacts in September

Day	Country Prefixes
11	JA—VK
12	HP, TI—LU; V7—KH6
13	4X—7Q; V7—KH6
14	V7—KH6
15	CO, HP, TI, HK—LU
20	HR, TG, XE—PY
21	JA—VK8
22	V5—I; JA—VK8
23	7Q—9H; KP4—LU, CX, PY; JA—VK8
24	XE—LU
25	VR—VK8
26	YV—LU; VR—VK8; JA—YD
27	JA—VK3,5
28	YV, KP4, XE—LU
29	JA—VK8
30	KP4—LU; W4—CX, PY; JA—V7, VK8

## 50-MHz Standings

Band standings for 50 MHz are compiled each October 1 for publication in the December issue. At least 50 countries worked are needed for inclusion. To be included in this list, you must also have submitted information within the previous two years. You don't have to work additional stations to remain in the standings, but please confirm your continued interest. You can submit data by e-mail to: [standings@arrl.org](mailto:standings@arrl.org). Paper submissions can be sent to Steve Ford, WB8IMY, ARRL, 225 Main St, Newington, CT 06111. New reporting forms are available from the same address with a self-addressed stamped envelope.

Call Sign	QTH	States	DXCC	Grids	Best DX (km) <sup>†</sup>	Call Sign	QTH	States	DXCC	Grids	Best DX (km) <sup>†</sup>	Call Sign	QTH	States	DXCC	Grids	Best DX (km) <sup>†</sup>
K1TOL	ME	50	132	821	—	WB4MLE	AL	50	73	214	—	N8XA	OH	50	91	—	—
WA1OUB	NH	50	132	725	14,982	WS4F	GA	50	69	375	16,288	K8UNV	OH	50	76	—	—
W1RA	MA	50	130	—	—	WB4JEM	FL	49	69	348	13,585	WA8RCN	OH	—	70	—	—
K1GPJ	ME	50	120	700	—	K1FJM/4	FL	49	69	200	—	KU8Y	MI	50	51	502	13,683
W1JR	NH	50	111	552	14,455	N4TL	NC	—	60	—	15,034	WB8YFE/9	IN	50	90	600	13,766
W3EP/1	CT	50	109	651	15,750	NA4I	GA	49	55	450	8,850	WF9X	WI	50	80	310	—
KA1A	NH	50	105	—	14,533	WD4MGB	FL	50	54	185	14,388	W9JUV	IL	50	78	362	—
W1AIM	VT	50	97	335	14,928	W5FF*	NM	50	128	850	—	K9LCR	IL	50	71	418	—
W1EJ	NH	50	93	417	14,924	K5CM	OK	—	121	—	—	W0UC	WI	50	65	566	—
NZ1D	MA	50	69	—	—	N5KW	OK	50	116	—	—	—	—	—	—	—	—
K2MUB	NY	50	116	—	—	W3XO/5	TX	—	113	—	—	N0LL*	KS	50	92	713	14,901
WA2BPE	NY	50	107	—	15,390	W5YY	TX	50	112	362	15,060	K0GJX	MN	50	90	309	13,818
W2CNS	NY	50	104	452	15,120	W5OZI	TX	50	107	750	15,141	K0US	NE	50	83	—	—
K2OVS	NY	50	61	306	13,000	WA5IYX	TX	50	105	384	14,592	KM0A	MO	50	79	705	15,313
WA2BAH	NY	49	58	436	11,040	WD5K	TX	50	102	802	14,927	K0TLM	KS	—	76	—	—
KA2MUC	NY	49	50	383	11,040	K5SW	OK	50	97	—	—	W0JRP	MO	50	69	523	—
W3JO	PA	50	120	—	14,929	K5AM	NM	50	94	682	15,744	W0KEA	CO	—	65	543	—
W3WFM	MD	50	119	680	14,038	WA5JCI	TX	50	91	624	—	K0FF	MO	50	55	453	12,761
W3BO	PA	50	109	514	12,840	N7JJS/5	LA	50	81	591	—	K0CJ	MN	50	55	—	—
K3QMX	PA	50	105	416	15,626	W5SSD	TX	50	70	—	—	—	—	—	—	—	—
AE3T	PA	50	90	—	14,500	W5AL	TX	—	64	531	—	VE1YX	NS	50	138	700	15,499
W3ZZ	MD	50	90	524	12,700	WA5VJB	TX	50	56	—	—	VE9AA	NB	49	75	500	—
WA3HMK	PA	50	79	—	—	W5UWB	TX	50	55	—	—	—	—	—	—	—	—
WA3DMF	MD	50	75	507	11,645	WA5QCP	TX	50	54	326	—	GJ4ICD	—	36	160	716	17,040
K3EAV	PA	50	53	—	12,838	W5ZN	AR	50	53	385	10,550	G0JHC	—	30	136	600	15,395
K4CKS	GA	—	123	642	—	N5BBO	TX	50	51	481	12,095	SM7FJE	—	20	140	626	—
W4OO	FL	50	112	525	—	WB5FCR	TX	50	50	175	—	NI6E/KH6	HI	50	105	515	19,684
K4IG	FL	50	109	—	15,000	K6QXY*	CA	50	107	—	15,555	VK3OT	—	25	103	355	—
W4UE	FL	50	106	269	15,000	N6CA	CA	50	96	—	—	JA9BOH*	—	5	72	—	—
N4CH	VA	50	104	616	15,000	N6XQ	CA	50	91	—	16,000	ZS6AXT	—	—	90	—	—
N4MM	VA	50	101	668	—	K6UM	CA	50	57	401	15,560	XE1GE	—	48	60	—	14,078
K4GOK	VA	50	83	—	—	W7HAH*	MT	50	58	617	—	—	—	—	—	—	—
N4KWX	VA	50	81	522	13,946	N7DB	OR	50	52	450	13,800	—	—	—	—	—	—
K6EID/4	GA	50	74	538	14,566	—	—	—	—	—	—	—	—	—	—	—	—

— Information not supplied

\* Includes some EME (moonbounce) contacts

† terrestrial

CO2OJ (EL83) reported an unusual 6-meter contact with HC2FG (FI07) on September 20 at 2100, with 59+ signals. The distance was about 3360 km. The Ecuadorian also worked several W4, 5, and 8 area stations, according to CO2OJ. These contacts could not have been via TE, because they were entirely north of the geomagnetic equator. The path geometry and time were consistent with normal F-layer propagation, but the solar flux that day would not have normally yielded an MUF as high as 50 MHz. Thus, the propagation mechanism is uncertain. Complicating the picture are the reports of shortwave listener Fernando Garcia in Monterrey Mexico (DL95). He reported hearing many FM broadcast stations in the 88 to 108-MHz band from Honduras and Nicaragua (2300 to 2450 km distant) at just about the same time. These receptions were entirely consistent with sporadic E, even if the season was a bit unusual. They were probably impossible by any known F-layer mode. Just what was going on that day is thus a bit of a mystery!

### Sporadic E

There was a sharp drop in 6-meter sporadic-E activity during September, as expected. Nevertheless, VE7SKA (CN88) reported a short opening on September 14 after 1500, which allowed stations in the Pacific Northwest (CN85, 86, 87, 88, 96) to make contact with southern Manitoba and Saskatchewan grids DO20, 21, and 70. N0LL (EM09) found NX4R and WB2QLP in Florida on the 18th, for the only sporadic-E opening Larry noticed during the month. John Butrovich, W5UWB (EL17) worked XE1INVX (EK09) on September 28 at 0107.

### Aurora

There were two aurora sessions during the

month. Operators in the Northeast reported the September 3-4 session as early as 2100, but 6 and 2-meter propagation extended only as far south as northern Virginia and west to Illinois. W7XU (EN13) worked WB8AUK (EN80) on 144 MHz around 2230 and VE3AVS (EN58) at 0139, but Arliss was distracted by the tropo opening then in progress. VE7SKA (CN88) made several 6-meter contacts into DO31 and DO33 after 0100. W7XU had some aurora on September 21 after 2100, but there were no other reports of this event.

### NOTES FROM ALL OVER

#### Two-Meter Beacons in French Polynesia

Jack Henry, N6XQ, reports that FO5JL has a beacon on 144.150 MHz from the island of Morrea (BH52gg). This is 4150 km south of Hawaii and 6575 km from Los Angeles. It runs 24 hours a day with 10 W and a nine-element Yagi 15 feet above sea level pointed 30 degrees, or roughly toward southern California. It identifies itself every 10 minutes with 10 WPM CW.

This beacon has the potential to allow discovery of new tropospheric ducting and transequatorial paths. The ducting effects of the Hawaiian high pressure system may extend far enough south to cover the islands of French Polynesia and Southern California at the same time, especially in winter. The chances for TE propagation on 144 MHz from Morrea to Hawaii may be possible, but the distance is shorter than any reported 2-meter TE to date. The Morrea to California TE path seems less likely, because the required path geometry (equal distance either side and perpendicular to the geomagnetic equator) cannot be met.

Even so, Hawaiians and Southern Californians may want to program 144.150 MHz into

their scanning sequences from now on. TE is most likely in late afternoon around the spring and fall equinoxes. With the upswing of the solar cycle, the next few years ought to be ideal for watching TE over these and other paths that cross the geomagnetic equator over distances of 5000 to 8000 km.

A second beacon on Tahiti, using the call FO5OK, is also planned for 144.150 MHz. That beacon could run as much as 100 W to two nine-element Yagis. Its transmissions would be coordinated with FO5JL. Eddy Tchung (FO5OK) is eager to have any reception reports from either beacon. Contact him by e-mail at [rava@mail.pf](mailto:rava@mail.pf) or telephone 689-426464.

#### Six Meters in Libya

5A1A has been on 50 MHz for two years, but the two operators of the station have made few contacts with their TS-690 and R7 vertical. For nearly two weeks beginning August 30, OE6DGG operated from Tripoli as 5A28 using an IC-706 MkII and a Yagi. Gunter made more than four dozen sporadic-E contacts into Europe, giving many operators a new country. Among the prefixes in his log were 9H, F, DL, PA, ON, G, HB, I, GJ and GW—including many well-known calls. Libya should be an easy country to work from North America as the solar cycle rises.

### VHF/UHF/MICROWAVE NEWS

#### New Laser Record

Howard Sibert, KC7AED, claimed a new Helium-Neon (red) laser distance record of 192.4 km in an article that appeared in the San Bernardino Microwave Society newsletter, distributed in September. On September 21, N7VUB and KC7AED set up on Four Peaks, Arizona, while WB7VVD and KC7PCV went to Smith Peak to

Jeffrey Leer, KG0VL, on top of Pike's Peak with his stacked 2-meter Yagi array mounted on the bed of his pickup truck. The antennas can be rotated while the pickup is in motion. This past summer, Jeff used this arrangement to make a number of meteor-scatter contacts during the Perseids with K0MQS (EN31) from northern Manitoba grids EO01, 02, 03, 04 and D097 at distances up to 1900 km—sometimes while driving down the road. Of course, his 400-W solid-state amplifier helped.

More interesting were his experiences with auroral E propagation. Jeff put up a three-element Yagi for 6 meters while camping in EO04 from August 10 to 14. He heard the VE8BY beacon every evening beginning around 0330 with clear auroral-E signals. On August 13, with a bright aurora overhead, Jeff heard the VE4VHF, VE6EMU, and VE8DW beacons with clear signals and worked VE8SK (DP22) with 10 W around 0445.

Jeff's auroral-E experiences are probably not unusual, but rather the normal early evening conditions in the auroral zone. There are just a few VHF stations in that part of the world to make use of this reliable propagation mode. Jeff will help make up for that with another trip to northern Manitoba grids EO16 and EO26, planned for November 26 to 29 (just about the time you read this). He will have 400 W on 144 MHz and 100 W on 50 MHz. If you are within 2000 km of his locations, look for Jeff on both bands!



the northwest. By 0215, operators saw the first flashes from lasers sweeping across their targets and it took less than an hour to get the aiming settled down to complete a CW contact.

Both stations consisted of 5 mW lasers, 16-inch Fresnel lenses, with photomultiplier and audio amplifiers. CW was accomplished by interrupting the laser beam, which was modulated by a fan blade. The previous 474-THz distance record listed in this column for April 1996 was 92 km, made by K6MEP and WA6EJO.

### Single-Yagi to Single-Yagi EME QSO

Many stations have made Earth-Moon-Earth (EME) contacts on 144 MHz using a single Yagi, but always with another station with at least two Yagis. On September 22, Dave Blaschke, W5UN, and Graham Daubney, F/G8MBI, completed the first known EME contact using single Yagis on both ends. Congratulations on a significant achievement! W5UN used an old 17-element KLM 17LBX and F/G8MBI used a K6MYC-design 6.6-wavelength Yagi with 18 horizontal and 18 vertical elements. He could switch between polarizations to keep up with Faraday rotation. Neither station had the benefit of ground gain, but both ran maximum legal power. The contact took over 20 minutes to complete on the third of a series of pre-arranged schedules. W5UN made more than a dozen other contacts with his single Yagi over that same weekend, but none with other single-Yagi stations.

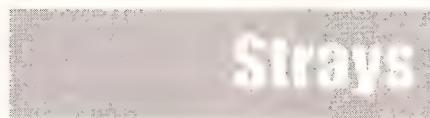
This is certainly a singular achievement and demonstrates what can be done with one Yagi. Nevertheless, it may be easy to overstate the accomplishment. The Yagis used were quite long and the gain equivalent to some multi-Yagi stations. F/G8MBI's 6.6-wavelength (43-foot) Yagi, for example, had the approximate gain of two stacked Yagis with at least 22-foot boom lengths and the antenna had the advantage of switchable polarization. This latter feature can give any EME station a significant advantage and is becoming increasingly popular.

### 10 GHz News

Jim Mitzlaff, WB9SNR, had good success using rain scatter during the first weekend of the ARRL 10 GHz Cumulative Contest. On August 16, he made contact with W2DRZ (FN021a) via rain scatter from a portable location in EN62ad. That Illinois to western New York contact was 742 km, Jim's best DX to date and an impressive contact for anyone.

Bob Larkin, W7PUA, reported more than a dozen 10-GHz contacts over 400 km by various stations in Washington and Oregon over the past summer. The longest was 664 km between W7LHL (DN17kn) and W7PUA (CN82xw), made over an extremely rugged path on August 2. Other stations participating in these contacts were NU7Z, KD7TS, W7YOZ, and K7VHF. It's good to know of 10 GHz activity from the Pacific Northwest.

QST



Joe, W3QLC, reports that a two-year effort by hams, especially ARRL members and officials, in Minnesota finally resulted in a new Amateur Radio license plate for motor vehicles. The effort, led by Joe and State Government Liaison Bill, K0OT, led to the introduction of a bill by Rep Mark Holsten (R, Stillwater) that resulted in the change. The main change was to add the words "AMATEUR RADIO" in place of the old, familiar "10,000 LAKES" motto. Displaying the new Minnesota ham tag are (l-r) Joe Hibberd, W3QLC; Minnesota Section Manager Max Wendel, N0FKU; and Rep Mark Holsten, sponsor of the bill.



The ARRL VUCC numbered certificate is awarded to amateurs who submit written confirmations for contacts with the minimum number of Maidenhead grid-square locators (indicated in italics) for each band listing. The numbers after call signs refer to endorsements. The totals shown are for credits given from August 1, 1997 to September 30, 1997. The VUCC application form, field sheets, rules, VHF awards managers list and reprint of the 1983 QST article on VUCC can be found on the Web at <http://www.arrl.org/awards/vucc/>. If you have comments or questions, e-mail us at [vucc@arrl.org](mailto:vucc@arrl.org). Please send an SASE for the current application form, field sheets, rules and list of VUCC awards managers in your area. Computerization of VUCC records has begun. Early in 1998, participants will have their VUCC's converted to the computer upon endorsement and receive a report of their progress. An information sheet will accompany each return to explain the new format.

Compiled by Bill Moore, NC1L, Century Club Supervisor

	50 MHz	144 MHz	432 MHz	1296 MHz	2.3 GHz	10 GHz	Satellite
100	W7AH	625					
891	NW70/DM18	300					
892	NW70	300					
893	WB8YFE	600					
894	WA9LWJ	350					
895	KC5WCO						
896	KD4HLG						
897	KO4MM	100					
898	KB9JIF	539	KA2KQM				
899	N4TYP	540	WA4LOX				
900	KM5HL	541	N0QJM				
901	N5QS	542	W7XU				
902	K3DMG	543	NW70				
903	N5WL	544	NW70/DM25				
904	KC8ERC	545					
905	N8WXQ	546	N0QJM	125			
906	WB5JHK	547	K1VYU	125			
907	KC5LOW	548	N4KWX	150			
908	WA4KXY	549	W7XU	150			
909	WT3P	550					
910	N2SQW						
911	KD4MYE	271	K4YA				
912	KE4MPV	272	N5MYH				
913	KB4LCR	273	N8KOL				
914	G8BQX	375	WA2TEO	90			
915	VA3DPB	150	WA9LWJ	60			
916	KW0T	225					
917	N0HJZ	300					
918	W0PVL	225					
919	W0JRP	525					
920	KS0F	500					
921	W3EP/1	600					
922	WA2TEO	500					
923	N3KFW	150					
924	KB4LCR	125					
925	KE4SIX	150					
926	KD4BOO	175					
927	KD4MYE	150					
928	KO4MM	200					
929	WA4GLV	250					
930	KC5ICS	200					
931	KM5HL	125					
932	KC5LOW	125					
933	WD5ITW	250					
934	WA7PDC	175					
935	K3DMG	150					

QST December 1997 89

## The Internet—Repeater Connection

By Murray Green, K3BEQ  
5730 Lockwood Road  
Cheverly, MD 20785  
e-mail [mgreen@erols.com](mailto:mgreen@erols.com)

The idea of Internet connections to Amateur Radio grew out of an article by James Millner, WB2REM, in the December 1996 *QST* ("A New 'Band' For Your Radio"). Since then there has been a growth, albeit small, of repeater connections to the Internet by enterprising amateurs. These "pioneers" have combined Amateur Radio with cyberspace in a very direct way, creating new global gateways! There have been several articles in *QST* concerning the repeater-Internet connection, but none have touched on *operational procedures*.

### Calling And Connecting

Amateurs calling into a repeater *from* the Internet should operate no differently than local users. Once the connection is established, announce your presence as you would if you were using a radio. It helps to let everyone know where you are and how you are reaching their system. "K3BEQ, listening via the Internet from Cheverly, Maryland."

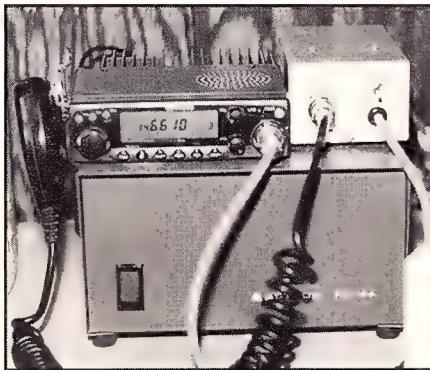
If you're on the repeater side, remember that repeater access from the Internet is normally *automatic* and does not require manual intervention. An operator can pop on the air at almost any time. You may simply be listening one day and hear a call from, say, Paris. "F6ABC listening!" To answer the call, just pick up your microphone and respond as you normally would.

Repeater access *to* the Internet can only be done manually by the local interface operator. That is, you must ask the interface operator to make a connection.

Personally, I enjoy using the Internet to bridge one repeater to another. Then you have whole groups of people in distant locations enjoying roundtable chats. When the interface operator announces that two repeaters are linked through the Internet, that's your cue to state that you are listening. Add your location to your announcement, especially if the connection is international. "K3BEQ in Cheverly, Maryland, United States, listening!"

### Transparent

The actual connection to the Internet is *transparent* to the repeater's normal operation. In essence, the repeater is not connected to an Internet-based amateur until that amateur actually accesses it. Therefore, calling "CQ Internet" from the repeater side is a waste of time. Unless your



This is the compact interface system that I use to link the Internet to the Green Mountain Repeater Association's 146.61 and 146.88 MHz machines near Washington, DC. The small box sitting next to the transceiver was designed and fabricated by Joe Nunemaker, KD3VR.

repeater is already linked to another repeater, no one will hear you. It's like yelling "Hello!" into the telephone before anyone actually calls you!

When the Internet link is in use, it doesn't tie up the repeater—unless a QSO is in progress, of course. An Internet user can connect to the repeater and just listen if he or she prefers; this has no impact whatsoever on the repeater. On the other hand, a connection from an Internet listener *does* prevent others on the Internet from connecting to the repeater. That situation may change very soon. New technology is available that will allow more than one Internet user to access the repeater simultaneously.

### Delay Times

When an Internet amateur turns it over to a local station to transmit, there is a longer delay than normal until the repeater reset tone is heard. Please be *patient* and wait for the tone to avoid repeater time-out. The extra delay is created by the time necessary for the interface VOX to drop out first, which then releases the repeater enabling the reset tone to be heard.

Conversely, when a local user turns it over to the Internet amateur, the repeater will usually drop out completely before he can begin to transmit. A short delay may also be experienced at this time before the Internet station begins to speak. This is caused by the various Internet connections including satellite relays. Based on our experience it varies from 5-20 seconds

after each transmission. As before, *patience* is the key.

### Call Sign Checks

When an Internet amateur tries to access the repeater, software instantly checks the amateur's call sign "off the air" and permits or denies repeater access. The call sign search is usually conducted using an online data base such as QRZ, Buckmaster, UALR, etc. Although FCC Part 97 regulations do not specifically address Internet—repeater connections, ample guidelines are contained on page 7-6 of *The FCC Rule Book* published by the ARRL.

### It May Sound a Little Strange...

You'll notice a wide disparity in Internet audio quality. It varies according to which sound cards and audio interfaces are in use. Internet line delays (e.g. packet losses) may create an odd stuttering effect at times. That is, there may be a loss of syllables or words followed by a pause, with the words put back together when the audio returns.

### Is it Just Apathy?

Internet-repeater networking has been overdue in this country. But despite the advantages, hams have been slow to warm up to this new mode of communication. There may be several reasons for this...

- A feeling among certain amateurs that this is not "real radio," but merely a sophisticated type of reverse autopatch.
- New technology intimidation.
- Fear of change.
- Lack of experience in international conversations.
- Limited number of amateurs operating from the Internet with the required software. (This results in an insufficient number of contacts to inspire regular use.)

### Explore and Enjoy

I don't believe that the Internet-repeater connection will be as revolutionary as the repeater explosion of the early 70s—but it is a worthwhile technological addition. Internet linking offers a taste of DX to hams who might otherwise not have an opportunity. It also offers incentive to upgrade for those who are not presently licensed to operate HF. If you have an Internet-linked repeater in your area, try it! Explore this fascinating new technology.

Who knows? If you listen carefully you might just catch that heavy-set guy with the red suit and the reindeer. You never know who will show up on a linked repeater!

## Region 3 Conference Bridges the Pacific

Modern Amateur Radio did not exist in the People's Republic of China until 1982. How far it has come in just 15 years! At the Ninth Conference of IARU Region 3 held in Singapore in 1994, Beijing was selected as the site of the Tenth Conference in September 1997. The staff and volunteers of the Chinese Radio Sports Association proved themselves to be up to the task of hosting an international conference; the meetings went smoothly, and the delegates gained new friends in China and a taste of the wonders of their ancient land.

A preliminary report on the conference appeared in *Happenings* last month, page 75. One conference action that may warrant reporting in more detail is its handling of the issues relating to Article S25, the section of the international radio regulations that relate specifically to the Amateur and Amateur-Satellite Services and are on the tentative agenda for the 1999 World Radiocommunication Conference.

In early 1996, IARU President Richard Baldwin, W1RU, appointed the Future of the Amateur Service Committee (FASC) to guide the formulation of an IARU position on Article S25. The FASC issued a discussion paper in April 1996, reported prior to the Region 1 Conference in Tel-Aviv in October 1996, and provided a further report prior to the Region 3 Conference. All three of these documents are available at the IARU Web site at <http://www.iaru.org>.

Following extensive discussion in one of its major Working Groups, the Conference resolved that Region 3 will submit comments to the FASC making the following points:

- The fundamental characteristics that distinguish the Amateur Services from other radiocommunication services are,

first, their non-commercial nature, and second, that the participants are operators having demonstrated qualifications. The service-specific regulations should reinforce these characteristics. Yet, the existing regulations offer little guidance to administrations as to the appropriate qualifications for an amateur operator's license.

- It is desirable that the role of the Amateur Services as a disaster communications resource be recognized explicitly in the radio regulations.

- It is desirable to delete from the service-specific regulations those provisions that also appear in the regulations of general application, and the provision relating to the banned country list.

- In its second report, the FASC had suggested a possible new approach to the construction of Article S25, including the offering of more detailed guidance as to operator qualifications in a separate ITU Recommendation that could be incorporated by reference into the radio regulations. The Conference found the new approach to be agreeable with minor editorial revisions, but urged that if incorporation by reference is used, the qualifications should be mandatory and not optional for administrations.

The Region 3 Conference position with regard to Article S25 is completely consistent with the policy adopted by the ARRL Board in January 1997 (March 1997 *QST*, pp 58-60).

The next opportunity for in-person discussion of the evolving IARU position with regard to Article S25 will be the Region 2 Conference, to be held in Venezuela in September 1998.

### STATE DEPARTMENT APPLIES FOR US CEPT PARTICIPATION

The State Department has applied for US participation in the European Conference of Postal and Telecommunications Administrations (CEPT) Amateur Radio licensing system. The move, September 22, could eventually make it easier for US hams to operate temporarily in European countries that participate in CEPT. Holders of a CEPT license could operate in CEPT-participating countries without having to apply for a reciprocal license.

"No doubt there will be some give and take between the European Radiocommunications Office (ERO) and the Department of State over the details before the US is accepted as a participant, but an important milestone has been reached," said ARRL Executive Vice President David Sumner, K1ZZ.

The action followed an ARRL suggestion to the FCC that the US take advantage of the CEPT Recommendation T/R 61-01 arrangements and issue a CEPT license that would be recognized by other participating administrations and valid for visits. Last fall, the FCC proposed amending the Amateur Radio rules to make it easier for hams holding a CEPT license or an International Amateur Radio Permit (IARP) to operate during short visits to the US.



A well-equipped station with rooftop antenna was available at the hotel for the use of conferees. Here, visiting Deutscher Amateur Radio Club President Karl Vögele, DK9HU, takes his turn at the controls of BT1IARU.



No conference would be complete without tokens of appreciation for the hosts. CRSA President Xu Zengwu accepted a plaque from the League's President Rod Stafford, KB6ZV.



"What grid square did he say he was in?" David Wardlaw, VK3ADW, and Steve Mendelsohn, W2ML, monitor two-meter action from the Great Wall.

Prepared by **John C. Hennessee, N1KB** • Regulatory Information Specialist

## Introducing...The Regulatory Information Branch Web Page!

It's easy to access the Regulatory Information Branch Web page. Go to the ARRL Web site at <http://www.arrl.org> and click on **Regulatory**. By the way, if you haven't yet explored the main ARRL Web page, *do it!* A tremendous amount of information exists on just about every aspect of Amateur Radio. If you're new to computers and if this alphabet soup of computer terms leaves you confused, take a look at the article by Steve Ford, WB8IMY, titled "Surf the Ham Webs!" It can be found on page 62 of the February 1996 *QST*.

The RIB Web page is packed with information. Under the heading of **ARRL Regulatory Information Branch Functions, Services and Handouts**, information on most of the duties of the Regulatory Information Branch can be found.

Do you need an FCC Form 610 to change the mailing address on your amateur license? Click on **FCC forms and assistance**. You can print an FCC Form 610 and several other amateur forms.

By clicking on **Covenant & deed restrictions packages**, you discover the rich body of information available on this topic. A "covenant package" can be obtained from ARRL HQ at no cost to ARRL members.

Does your town have an overly restrictive ordinance? Click on **PRB-1**, the FCC's limited preemption of local ordinances. PRB-1 is not a cure-all and local governments can still zone to protect their citizens in matters relating to safety, health and height. The PRB-1 package is more detailed and it is available from ARRL HQ for amateurs faced with such problems. The charge for members is \$10 (\$15 for non-members). *Remember that PRB-1 specifically excludes covenants from its jurisdiction.*

There are no lawyers in the Regulatory Information Branch, so legal advice can't be given. The role of the ARRL is to provide general guidance and to point amateurs toward an appropriate source of help. For legal advice, amateurs may contact ARRL Volunteer Counsel members. VCs are hams who are also lawyers. For specific information, click on the **Volunteer Counsel Program** and for the names of VCs, click on **Referral**. The Volunteer Consulting Engineer Program is styled after the successful VC Program.

Do you need information and applications for the ARRL Ham Radio Equipment Insurance? Click on **equipment**. How about information and an application for the ARRL Club Liability Insurance? Click

### Regulatory Information Branch

- [Functions, Services and Handouts](#)
- [International Operating - News and Resources](#)
- [Your Local Regulatory Environment](#)
- [ARRL Recommended Band Plans - Information](#)
- [Page author: \*reginfo@arrl.org\*](#)
- [Page last revised 10:30 AM ET 10/15/97](#)

• [Attention Attorneys and Professional Engineers: ARRL Wants You!](#)

#### ARRL Regulatory Information Branch Functions, Services and Handouts:

- Questions about FCC rules and regulations (Part 97).
- [Edits the ARRL FCC Rule Book](#).
- [FCC forms and assistance](#).
- [Reciprocal licensing and operating information](#).
- [Antenna-height ordinance information packages \(PRB-1\)](#).
- [Covenant & deed restriction packages](#).
- [Local-law pre-emption assistance and information packages](#).
- [TVI, CATVI and other RFI information packages](#).
- [International Travel Host Exchange](#).
- [Volunteer Counsel program and referrals](#).
- [Volunteer Consulting Engineer program and referrals](#).
- [ARRL equipment and club liability insurance programs](#).

on **club liability**. Eligibility for low cost insurance is a popular benefit of ARRL membership.

You can order a copy of *The FCC Rule Book: Complete Guide to the FCC Regulations Governing Amateur Radio* by clicking on **The FCC Rule Book**. Published by ARRL, it is updated frequently and contains over 300 pages of material including a current copy of Part 97. We frequently hear from amateurs who quote old rules because they don't own a current copy of *The FCC Rule Book*!

There's also information under the heading of **International Operating**.

If you're going to a foreign country and you want to operate your amateur station, you are required to obtain a reciprocal permit and to pay a licensing fee in all countries of the world except Canada and New Zealand (VHF/UHF only). Complete reciprocal licensing information, including forms, is available on the RIB Web page by clicking on **Reciprocal licensing and operating information**. The US has applied for participation in the CEPT arrangement. Once the US is accepted, it will be easier for American amateurs to operate in Europe. The US is already part of a similar arrangement with some countries in North and South America that will take effect when the FCC completes rulemaking.

Need to know if you can allow your non-ham friend to participate in a conversation with a foreign ham? Click on **third-party agreements**.

Under the heading of **US Regulatory News and Resources**, amateurs can find information dealing specifically with Part 97 of the FCC Rules.

Do you have a question about the Part 97 business rules? Click on **New FCC rules Part 97.113**. This section should be used in conjunction with *The FCC Rule Book* since the interpretation material is quite helpful in understanding these rules. Click on **Amateur Frequency Allocations** for a look at amateur frequencies broken down by band, class and mode. More detailed information can be found in *The FCC Rule Book* and *The ARRL Operating Manual*. Find out details on filing formal comments in an FCC proceeding by clicking on **How to submit comments**. The RIB Web page also contains a current copy of Part 97. Click on **Part 97 - Amateur Radio Service**.

**About Your Local Regulatory Environment** is the heading under which amateurs can find detailed information on PRB-1, the VC and VCE Programs. There's even a list of ham radio license plate fees by state.

Last, if after examining the RIB Web page your question remains unanswered, contact the Branch staff by clicking on the appropriate staff e-mail address. Is there something you think should be included on the RIB Web page, but isn't? Contact Tom Hogerty, KC1J at [thogerty@arrl.org](mailto:thogerty@arrl.org). We welcome your suggestions.

Edited by **Steve Ford, WB8IMY** • Managing Editor

## 1997 AMSAT-NA Space Symposium

I'm typing these words on a laptop as AMTRAK/VIA train number 64 rolls through the Ontario countryside, heading back to the States and home. I want to transcribe my reporter's shorthand notes while the 1997 AMSAT-NA Space Symposium is still fresh in my memory.

Toronto was a delight, as Toronto always is. It's probably one of the cleanest, safest cities in North America. Among its surrounding suburbs you'll find Etobicoke. That's the home of the Delta Hotel where more than 200 satellite enthusiasts converged for three days of education, fellowship and fun.

### Something for Everyone

Several forums were devoted to beginners and beginner satellites. Laura Halliday, VE7LDH, did her best to destroy the myth of "difficult" microwave technology. Ed Krome, K9EK, did much the same, offering practical information for microwave Phase 3D ground stations.

The symposium also saw proposals for new satellites. Fred Winter, N2XOU, and Ken Ernandes, N2WWD, discussed their ideas for a new EasySat. Phil Chien, KC4YER, presented his concept of Phase 4 *LITE*, a kind of "drifting" geosynchronous bird.

Other interesting seminars included:

- A simple BPSK software modem by Doug Quagliana, KA2UPW. Thanks to Doug's work, we may soon be able to access the 1200-baud PACSATs without expensive stand-alone PSK TNCs. A PC and a sound card are all you'd need.
- Digital voice modulation for future ham satellites by Dan Schultz, N8FGV.
- Amateur Radio aboard the International Space Station by Frank Bauer, KA3HDO, and Will Marchant, KC6ROL.

### Whither Phase 3D?

There was little new to report on the progress of Phase 3D. The integration teams are continuing their work and AMSAT is still looking for a ride to orbit. Bdale Garbee, N3EUA, reported that the RUDAK package was in Orlando and ready to fly. "If Phase 3D flew next week, we'd have RUDAK ready with BBS functionality at 9600 baud similar to what we have now with OSCARs 22, 23 and 25."

Of course, there was plenty of speculation at the symposium about when (and how) Phase 3D would reach orbit. Everyone will be watching the flight of Ariane 502, which may take place before this is-



Breaks between seminars provide opportunities to chat and check out the exhibits.



Dr Paul Shuch, N6TX, and his homebrew SETI receiver.

sue goes to press. Not only will fingers be crossed for a successful launch, there will be keen interest in the payload data. It will give the Phase 3D engineers a complete picture of the forces their satellite is likely to encounter—if it rides on an Ariane 5.

The launch delays have been costly. As AMSAT-NA Executive Vice President Keith Baker, KB1SF, pointed out, the AMSAT-NA Phase 3D fund has been *depleted*. The organization is now dipping into its general funds to support the project. Just as no one knows when the



Ed Krome, K9EK, describes practical, easy-to-build microwave ground stations.

satellite will fly, no one knows the final price tag. "The launch campaign itself is expected to cost in the neighborhood of \$100,000," Keith said.

All AMSAT organizations are looking for new sources of money, and issuing more appeals for assistance from the ham community. AMSAT-UK, for example, is offering to engrave your name on yet another plaque that will be placed aboard Phase 3D—for about \$280. AMSAT-NA has been dedicating portions of the spacecraft, including solar panels, to high-rolling contributors.

## Survey Favors APRS Move

In September *QST*, I discussed the "hot potato of the day," ie, moving all US APRS activity to 144.39 MHz in deference to Earth-to-spacecraft Amateur Radio communication on 145.80 MHz. I discussed the pros and cons of such a move and asked for your opinion as a survey.

I received 229 responses and you voted nearly 2 to 1 in favor of moving APRS to 144.39. The actual results were 147 (64%) in favor of the move to 144.39 and 82 (36%) against the move.

Approximately one third of the respondents were APRS digipeater owners/operators and they voted against the move, but by a very slim margin of one vote: 42 (51%) digipeater owners/operators voted against the move and 41 (49%) voted in favor of the move.

On the other hand, 146 of the respondents were not APRS digipeater owners/operators and they voted overwhelmingly in favor of the move: 106 (73%) in favor and 40 (27%) against.

Here's an interesting aside: 217 responses arrived by e-mail, 6 by postal mail and I collected 6 in person at the ARRL National Convention in Jacksonville. This is in stark contrast to the last time I conducted a survey in a *QST* column, when nearly 100% of the responses arrived by postal mail!

So, where do we go from here?

### Compromise Proposed

At the recent Digital Communications Conference (DCC), Frank Bauer, KA3HDO, AMSAT-NA Vice President of Manned Space Operations, presented a paper that discussed why manned space ham operation is important, why they need a single frequency and why 145.80 MHz was the only choice left to them. He closed by suggesting a compromise, but provided no specific offers.

I'll let Steve Dimse, K4HG, the coordinator of the DCC APRS Seminar, pick up the story from here:

"I thought about Frank's presentation for a while, and decided to see how serious he and AMSAT-NA were about a compromise. I looked at the old APRSSIG messages talking about a move, compiled the objections, and proposed a compromise. I was pleased

ly surprised: Frank upped the ante and proposed an APRS/Manned Space Alliance. I'll list the objections below and how we addressed them."

"I want it to be clear I do not feel that I am 'negotiating' on behalf of all APRS users. I have made it clear to Frank that APRS has no single spokesman and APRS functions as a controlled anarchy more than anything else. Likewise, this offer has not been approved by AMSAT, TAPR or ARRL. I am making a proposal to APRS users, hoping to foster discussion and reach a consensus. No deal has been struck, nothing is written in stone."

### Objections

1. APRS was there first.

"True enough and there is no way to compromise this. APRS moves; no halfway solution is possible."

2. MIR is dying, why bother?

"This is not about MIR, it is about the International Space Station (ISS), which hopefully begins construction next year. It was announced at the DCC APRS Seminar that Amateur Radio has been officially manifested by NASA for ISS."

3. APRS has not been welcomed on the space assets and is considered a second class citizen.

"This is not really true. Yes, APRS users were told to stay away from MIR, but MIR is not run by AMSAT-NA. On the other hand, SPRE and STS-72 were experiments where APRS was specifically encouraged. In any case, to allay fears, we will ask AMSAT-NA, TAPR and ARRL to officially support any agreement we reach and to acknowledge that both APRS and manned space operations are vital and exciting modes that provide benefits to ham radio in general and the public at large. Furthermore, I asked for a guarantee of APRS experimentation and operation on future digital satellites, Phase 3D and ISS. Frank personally guaranteed that APRS will be permitted and he will work to get AMSAT-NA to commit to the same on other hardware, but of course, that is not within his personal purview."

4. Why should I pay to move my APRS digipeater?

"True enough. For most of us, the move will simply require turning the frequency dial. However, the cost of moving will be borne disproportionately by digipeater owners who may have to replace not just crystals, but cavities, antennas and radios

as well, since many use commercial equipment that may not be tunable to 144.39 MHz. I proposed an APRS-QSY fund, most likely administered by TAPR, that will reimburse digipeater owners for their expense. I pledged \$300 to the fund and challenged Frank to match me, which he did. We will solicit funds from the AMSAT-NA and TAPR membership, as well as the general APRS and ham communities. Commercial entities will also be approached, both for cash and discounts on equipment. The details of this system are many and will be worked out before we proceed."

5. I don't want to go through the process of coordinating another frequency.

"How many people are on 144.39 MHz? No one knows, but likely not many. Until recently, it was identified in some band plans as a "future OSCAR" subband. If there are any local users, perhaps they can be advised of the situation and the need for us to move—maybe they can be included in the reimbursement program. Also, while re-reading the FCC Rules, I discovered that simplex operations do not require frequency coordination. If you have a coordinating body that handles digital simplex systems, work with them, but most of us can just get on the new frequency."

"Let's hear your comments and suggestions. Please try to be constructive."

"Listen on 144.39. If you hear nothing, put up a beacon explaining our plans. Besides establishing our use of the channel, it will draw out any other users of the channel so we can talk with them."

"If you have a digipeater that requires money for the move, figure out what you need and what it will cost. We plan to set up a database on the Internet for dissemination of this information."

"I think this is a great opportunity for APRS to gain visibility and respectability, not to mention a true nationwide channel, which we can share with Canada. It also has the potential to make us look very selfish if we don't compromise. Please think about this seriously. If you don't like it, try to come up with constructive alternatives."—Steve Dimse, K4HG, e-mail [k4hg@tapr.org](mailto:k4hg@tapr.org)



## Thirty Years of CLARA

YLs all over the world are preparing to celebrate the holidays, but they're way behind CLARA. The ladies of Canada got a head start with a New Year's Eve celebration at their 30th anniversary convention September 26-28.

The Canadian Ladies Amateur Radio Association (CLARA) convention was held at the Howard Johnson Plaza Hotel in Aurora, Ontario, northeast of downtown Toronto. My first chance to meet the convention-goers was at breakfast Saturday morning. Arriving a few minutes late, I found most of the tables were already full! Glancing around the room I didn't see any faces or calls I recognized and I ended up sitting at an empty table on the other side of the room. To break the ice, one of the YLs came around with a sheet of 33 questions (of course!) for each person at breakfast.

They started with "Meet Someone Who" and ranged from "has been on a DXpedition," "took part in Field Day" to "has been a net control station." You were encouraged to have someone fill in his or her call sign in answer to each question. Everyone went from table to table introducing themselves and finding out more about each other in order to fill in the blanks. Those who were able to fill in a "rare" category were very popular! It's something you may want to use at your next club function to encourage socializing.

YLs from Italy, Norway, Japan, Australia, New Zealand, Sweden, the United States and Canada enjoyed the many organized activities and forums. Many went on a trip to the Fred Hammond Radio Museum and operated the station there. Others went on an antique steam train ride where even the engineer and conductor were hams. At every event there were drawings for prizes donated by CLARA members and friends.

The YLs exchanged tokens of friendship, a YL convention tradition. These included hand-made crochet items (teddy bears, potholders), exotic hand-painted "eyelash" QSLs and pins (a convention favorite). Above all, they shared their ideas, concerns and personal experiences in Amateur Radio.

One of the many fun events of the convention was a CW contest. It was won by Elizabeth Anderson, VE7YL, who was able to answer questions sent at 50 WPM. She said she could have copied 60 WPM, but the testers didn't have anything faster!



A CLARA group photo, taken Sunday morning, September 28, after our farewell breakfast at the Howard Johnson Plaza Hotel in Aurora, Ontario, Canada.

GEORGE TRAVERS, N2GA

### The GOTa Forum

A forum about the GOTa (Girl Guides on the Air) program was presented by Helen Archibald, VE2YAK. GOTa is similar to the American Scout Jamboree on the Air. Helen said last year there were over 6000 patches sent out for participation in GOTa! Station operators and Girls Guides are eligible to receive an embroidered patch.

GOTa will be held February 21 and 22, 1998. It's always held the closest weekend to February 22, which is Thinking Day in Canada. The GOTa stations use the special suffix GGC (except in the VE3 area where it's VE3GGQ). Since most of the GOTa operating frequencies were outside the US band, the YLs at the CLARA convention decided on 14.288 MHz as a frequency for YLs outside Canada to contact GOTa stations. It would be nice to have a good showing of YLs, so mark your calendars for this event!

For more information you can go to the GOTa Web site at <http://www.guidezone.skl.com/gota.htm>, or the Girl Guides of Canada Web page at <http://www.girlguides.ca>.

### Trilliums Close their Books

The CLARA convention was bittersweet for the Ontario Trilliums, the first YL organization in Canada. In 1967 the Trilliums saw the need for a national YL organization, similar to the YLRL, and created CLARA. The new group was funded by the Trilliums and a YL group called the Maritime Sparkettes. They created an emblem for CLARA incorporating the two

major interests of the YLs involved—CW and gardening (hence the Morse code key and flower pot in their logo).

CLARA flourished and became the national YL voice the founders had envisioned. Seeing no further need for parallel organizations, the Ontario Trilliums decided to officially close their books. Thelma, VE3CLT, presented the Trilliums' archives and remaining funds to CLARA president Renee Devenny, VA3EZ, at the CLARA business meeting Saturday. Renee is one of the new generation of YL hams who have stepped into a leadership role in a national YL organization.

### Kudos to All

Proclamations from the Prime Minister, Mayor and other officials congratulated CLARA on its 30 years of contributions to Amateur Radio. These were obtained by Cathy Hrischenko, VE3GJH, the event coordinator and spark of this gala. Cathy, a founding member of CLARA, was its president in 1973-74 and 1993-94. She also writes a regular YL column for the country's national ham magazine *The Canadian Amateur*. In addition to organizing the event, Cathy created imaginative favors and decorations for the convention. One of the most intricate was a handmade Ukrainian Easter egg presented to each YL at the "New Year's Eve" banquet on Saturday night. A troupe of Ukrainian dancers and a DJ added to the celebration. Congratulations to CLARA for a wonderful event!

Happy Holidays to all!

33, Diane, K2DO

**QST**

# Hamfest Calendar

Edited by **Gail Iannone** • Convention Program Manager

**Attention:** The deadline for receipt of items for this column is the **1st of the second month preceding publication date**. For example, your information must arrive at HQ by **December 1** to be listed in the **February** issue. Hamfest information is accurate as of our deadline; contact sponsor for possible late changes. For those who send in items for Hamfest Calendar and Coming Conventions: Postal regulations prohibit mention in *QST* of prizes or any kind of games of chance such as raffles or bingo.

(Abbreviations: *Spr* = Sponsor, *TI* = Talk-in frequency, *Adm* = Admission.)

**California (Livermore)**—Dec 7. Noel Anklam, KC6QZK, 510-447-3857.

**Florida (Fort Myers)**—Jan 3-4; Saturday 9 AM to 4 PM, Sunday 9 AM to 2 PM. *Spr*: Fort Myers ARC. Shady Oaks Community Center, Exit 25 off I-75, go W and take right onto Terry St, Rte 80. Vendors, dealers, tailgating, free parking, refreshments. *TI*: 147.345. *Adm*: advance \$4, door \$5. Colleen Sammons, KQ4TR, 3667 Kelly St, Ft Myers, FL 33901, 941-936-1431; [csammons@juno.com](mailto:csammons@juno.com).

TARRL Hamfest

**Florida (Lake City)**—Dec 13; set up Friday 4-7 PM; Saturday 6-8 AM; public 8 AM to 4 PM. *Spr*: Columbia ARS. National Guard Armory, Lake Jeffrey Rd, I-75 to US 90 E. Hamfest and Computer Show, tailgating (\$6), vendors, exhibitors, test table, refreshments. *TI*: 145.49. *Adm*: advance \$4, door \$5. Tables: \$8 (8 ft, first-come, first-served basis, chairs provided). Joe Aymond, WD4EOJ, Box 1649, Lake City, FL 32056, 904-935-2405 eves; [wd4eoj@isgroup.net](mailto:wd4eoj@isgroup.net).

**Florida (Okeechobee)**—Dec 6, 8 AM to 4 PM. *Spr*: Okeechobee ARC. AG Center, Rte 441, N of Rte 70. ARRL info booth, VE sessions. *TI*: 147.195 (100 Hz). *Adm*: advance \$4, door \$5. Al Berryman, AD4RZ, 3037 SE 21st Ct, Okeechobee, FL 34974, 941-467-0516; [ad4rz@juno.com](mailto:ad4rz@juno.com).

**Indiana (Evansville)**—Nov 29. Neil Rapp, WB9VPG, 812-479-5741.

**Indiana (South Bend)**—Jan 4, 8 AM to 3 PM. *Spr*: Michiana Valley Hamfest Assn. Century Center, US 31-33 Business, N at Jefferson. *TI*: 145.29. *Adm*: advance \$4, door \$5. Bob Denniston, KA9WNR, 21970 Kern Rd, South Bend, IN 46614; 219-291-0252.

**Minnesota (Golden Valley)**—Dec 6. Chris Peterson, KG0BP, 612-520-0515.

**New York (Marathon)**—Jan 10, 7 AM. *Spr*: Skyline ARC. Civic Center, Rte 81, Exit 9, follow signs. VE sessions. *TI*: 147.18. *Adm*: \$2. Barbara Mudge, KB2TIK, 3364 Rte 221 W, Marathon, NY 13803; 607-849-6751.

**South Carolina (Union)**—Dec 13. Roger Gregory, KD4YFB, 864-427-1462.

**Tennessee (Morristown)**—Jan 3. Perry Hensley, N4PH, 423-828-4848.

## Attention All Hamfest Committees!

Get official ARRL sanction for your event and receive special benefits such as free prizes, handouts, and other support. If you are an affiliated club, you are also entitled to receive a 10% commission on sales of League publications!

It's easy to become sanctioned. Contact the Convention and Hamfest Branch at ARRL Headquarters, 225 Main St, Newington, CT 06111. Or send e-mail to [giannone@arrl.org](mailto:giannone@arrl.org).



## Coming Conventions

Edited by **Gail Iannone** • Convention Program Manager

### 1997

November 22-23  
Florida State, Tampa\*

### 1998

February 7-8  
Florida State, Miami

February 7-8  
Mississippi State, Jackson

\* See November *QST* for details.

## Strays

### W9NN AND W9JJ

◊ Bart Jahnke, W9JJ (ex KB9NM), is one of the several Headquarters staff members who got a new call sign via vanity call sign gate 2. Bart recently received a package of memorabilia from Bob Baird, W9NN, who had held W9JJ as a second-station call sign back in those good old days. Here are some of the highlights:

Bob sent a copy of a letter, dated June 22, 1928, from The Radio Division of the Department of Commerce that identifies the date on which the use of the "W" prefix for US ham stations began, and shows that the Morse "de" came into FCC-mandated use at the same time. The letter says:

"You are herewith advised that amateur call letters are now being assigned preceded by the letter 'W'. ... It has been decided that 'W' will precede all amateur calls for stations within the Continental limits of the United States and the letter 'K' shall precede all such calls for stations in the insular possessions and Alaska.

"The use of the 'W' before your regular call letters, however, is not to begin until October 1, 1928, after which time [it] should be used for all transmissions.

"Amateur station licenses already issued will require no change or amendment. After October 1, 1928, however, all Continental United States amateur stations will make use of the prefix 'W' for both foreign and domestic communications. Example: Whereas, the present practice in calling is, 'nu 6AA 6AA 6AA nu 8AA 8AA 8AA', after October 1, 1928 it will be, 'W6AA W6AA W6AA de W8AA W8AA W8AA'.

"Respectfully, S. W. EDWARDS, U. S. Supervisor of Radio."



It's W9JJ or W9NN, depending on how you look at it!

Bob also sent a photocopy of his "License to Radio Operator, Amateur Extra First Class" (number 2809) dated January 25, 1932, a wonderfully ornate certificate. Bob commented that when the FCC took over the radio regulation business in 1932, they canceled all the Amateur Extra First Class licenses. He and others holding that class license were so annoyed that they didn't take the Amateur Extra class exam when it was introduced in 1953. Bob finally took the exam last summer at the urging of fellow club members. Bob's comments about the two exams, which he took 64 years apart, were that "The 'first one' without books was rough—the current one is a 'memory test'."

He also sent a copy of a photo taken November 2, 1922, of spark station 8AIB, a collaborative effort of four friends—Chas Fertick, W8AIB; Clinton Petry, 8AWN; Allen Apple, 8CNL (later K4ILX); and Bob himself. The station's best spark DX was a contact with a United Fruit banana boat off the coast of Brazil in late 1921, radio call sign DZ. In 1952, Bob worked VP1AA in Belize and learned that he had been the ship's operator at DZ for that contact. Bob says he would love to hear from other old timers who operated spark, to trade tales of the old days.

## Attention Hamfest and Convention Sponsors:

ARRL HQ maintains a date register of scheduled events that may assist you in picking a suitable date for your event. You're encouraged to register your event with HQ as far in advance as your planning permits. Hamfest and convention approval procedures for ARRL sanction are separate and distinct from the date register. Registering dates with ARRL HQ doesn't constitute League sanction, nor does it guarantee there will not be a conflict with another established event in the same area.

We at ARRL HQ are not able to approve dates for sanctioned hamfests and conventions. For hamfests, this must be done by your division director. For conventions, approval must be made by your director and by the executive committee. Application forms can be obtained by writing to or calling the ARRL convention program manager, tel 860-594-0262.

**Note:** Sponsors of large gatherings should check with League HQ for an advisory on possible date conflicts before contracting for meeting space. Dates may be recorded at ARRL HQ for up to two years in advance.

## By Kathy Capodicasa, N1GZO

It is with deep regret that we record the passing of these amateurs:

W1CEQ, Danforth M. Googins, Kennebunk, ME  
 \*W1FB, Doug DeMaw, Luther, MI  
 W1FCO, John H. Bergstedt, Groton, CT  
 AF1G, Joseph J. Mayer, Alna, ME  
 WA1ITZ, Justin C. Barton, Randolph, VT  
 NUIJ, Stanley C. Aldrich, Rochester, NH  
 W1LNI, Russell H. Lowd, Portland, ME  
 K1PXF, Louis B. Rollins, South Portland, ME  
 N1QWY, Emma T. Parker, Menemsha, MA  
 \*W1SP, C. V. Anderson, Terryville, CT  
 W1TRE, Barbara A. Harrington, Malden, NH  
 W1UFR, Joseph A. Condi, Pittsfield, MA  
 K1VKT, Frank McNamara, Lowell, MA  
 K1ZUP, J. H. Sleeper, Wakefield, MA  
 WB2AIW, Robert W. Steele, Lockport, NY  
 W2DYR, Eric W. Cruser, Lakehurst, NJ  
 N2FEQ, Edwin C. Brummer, Mahopac, NY  
 WB21OI, Erwin H. Berg, Margate City, NJ  
 KF2JW, Stanley M. Hoffman, Staten Island, NY  
 K2JWT, Walter A. Mordes, East Northport, NY  
 WB2OVO, Jerome Wayne, Fayetteville, NY  
 N2QVM, Barbara Grebenstein, Convent Station, NJ  
 N2RDO, John A. Burton, Bridgewater, NJ  
 K2VVI, George Rosien, Bergenfield, NJ  
 N2XXY, Clemens C. Ray, Binghamton, NY  
 W2YL, Joel J. Young, Elmira, NY  
 KA3ATQ, John J. Kirby, Pittsburgh, PA  
 W3CAU, Karl M. Wiegandt, Allentown, PA  
 K3ETS, W. D. Zeares, Dallas, TX  
 N3IYC, Wallace Bailey, Beltsville, MD  
 W3JZP, Elliott H. Glunt, Silver Spring, MD  
 N3LCL, Charles R. Gross, Norwood, PA  
 AA3MA, Oliver R. Ellis, Oxon Hill, MD  
 K3OKL, Edward L. Hayden Jr., Annapolis, MD  
 N3VRQ, Donald F. McAvoy, McKeesport, PA  
 KV4AD, W. B. Fageol, St. Thomas, VI  
 W4AMX, Philip Konter, Savannah, GA  
 W4AWS, Arthur B. Hale, Safety Harbor, FL  
 KS4BM, John L. Glisson, Richmond, VA  
 KK4DR, Wilmer E. Brewer Jr., Savannah, GA  
 KD4FKF, John Bosch, Port Richey, FL  
 N4FLW, Irving Strobing, Butner, NC  
 W4GDQ, Alvin F. Badgett, Decatur, GA  
 K4GRH, Walter J. Parker Sr., Jensen Beach, FL  
 N4GSS, Eugene D. Bench, Fort Walton Beach, FL  
 WA4HEJ, O. T. Keeling Jr., La Vergne, TN

## December 1922

♦ Clyde Darr, 8ZZ, presents the cover once again, showing hams at the ready—"Transatlantic Tests QRV," with several European countries ready to give a try with the North American hams. The editorial addresses the upcoming tests, which will take place "but a few days [after] this issue of *QST* reaches our readers."

The lead article, "QRV for the Tests?" further fans the enthusiasm of the moment, as does the following article by Traffic Manager F. H. Schnell, "The Transatlantic Finals" (the latter explains, among other topics, how to convert between G.M.T. and your local time). Paul Godley, 2ZE, tells how to hear signals from across the ocean in "Listening for Europe." C. R. Leutz presents his "Notes on a Super-Heterodyne," with discussion of the advantages of superhet receivers and how to build them. "Some More Records" tells that "6XAD, the experimental station of Major Lawrence Mott...at Avalon, Catalina Island, Calif., [has] been heard...in Australasia." Tests are being set up for the coming winter. The article reports that, "to the best of our belief this is the world's amateur long-distance transmission record." Howard Mason, 7BK, tells about "The Radio Lizz" ("Lizz" comes from the Model A Ford being called the "Tin Lizzie"), wherein he has installed a radio receiver in his au-

K4HVL, C. C. Fuller, Old Hickory, TN  
 W4IFN, Warren Snyder, Milan, TN  
 KE4KNG, Jack A. Hunter, Jacksonville, NC  
 N4LLC, Lawrence E. Elbrecht Sr., Port Saint Lucie, FL  
 W4MBA, Robert M. Avery, Scottsdale, AZ  
 W4MBR, James H. Ellis, Vero Beach, FL  
 N4MPH, Clyde Stansel, Vero Beach, FL  
 W4MZA, John D. Rule, Merritt Island, FL  
 N4PEK, Dwight L. Williamson, Falls Of Rough, KY  
 W4RFX, J. W. Lunsford, Lebanon, TN  
 N4RLV, Ruby M. Rankin, Asheville, NC  
 K4RST, Judson V. Arthur, Montgomery, AL  
 K4SXM, Idee Johnson Sr., Virginia Beach, VA  
 WB4TJJ, Edward E. Nicholas Jr., Lancaster, VA  
 KD4TPY, William R. Quinn Jr., Dalton, GA  
 K4UHW, Stacey M. Mills, Charlottesville, VA  
 K14UP, Gerald M. Hay, Raleigh, NC  
 W4ZQJ, Frederick E. Rossnagel, Prattville, AL  
 \*KU5B, Jack M. Bickham, Norman, OK  
 KJ5FP, Hubert Smith Jr., Searcy, AR  
 WD5GTM, Bill E. Jones, Jonesboro, AR  
 AB5MP, Dale G. Johnson, Edmond, OK  
 \*W5OQ, Vernon L. Dillaplain, Little Rock, AR  
 W05Q, Vincent L. Irvan, Arlington, TX  
 W5WPF, John Avila, San Antonio, TX  
 K5WRM, Claude W. Hollen, Monahans, TX  
 KA6APP, C. H. Reeks, Fresno, CA  
 \*AA6BB, Gerald D. Branson, Junction City, OR  
 KA6BWW, Robert N. Fargo, Los Banos, CA  
 KC6FAW, Melvin T. Hurley, Kensington, CA  
 W6GB, Alan S. Nusbaum, Sun City West, AZ  
 KH6HAP, James L. Williams, Haleiwa, HI  
 WB6HSP, Robert G. Robb, Anaheim, CA  
 N6JGU, L. E. Whitcomb, Altus, OK  
 WA6KNF, Bernard A. Sword, Weslaco, TX  
 W6MU, David Muir, Stockton, CA  
 KA6O, John T. McCarley, Aptos, CA  
 W6RXA, Robert F. Holtz, La Jolla, CA  
 W6TLW, Earl R. Boyd, Loveland, CO  
 WA6TTT, Nicholas Wogoh, Napa, CA  
 W6VBU, Warren V. Bruner, Carmichael, CA  
 KC7AHL, Tino Venzon, Sparks, NV  
 W7CHW, Ernest E. Campbell, Seattle, WA  
 K7COM, James P. Downward, Salt Lake City, UT  
 KC7CWN, Charles R. Keeney, Central Point, OR  
 AA7IV, Barbara A. Oppenheimer, Seattle, WA  
 W7MNA, Wilbur Kent, La Conner, WA  
 K7OAX, Carl Wyatt, Tempe, AZ  
 WA7SKJ, William F. Nibouar, Phoenix, AZ  
 \*N8CIU, Harry F. Fretchen, Mansfield, OH  
 AA8ED, Edward L. Clark, Zanesville, OH  
 W8EYH, R. C. Miley, Zephyrhills, FL  
 \*W8GBR, Larry R. Baine, Lake Odessa, MI  
 W8GCZ, Emory J. Reaser, Princeton, WV  
 \*AB8P, Allan Severson, North Olmsted, OH  
 K8MGN, Raymond E. Houser, Wooster, OH

K8RIF, Charles F. Stevens, Lakeland, FL  
 W8RLR, Glenn Mast, Wooster, OH  
 W8SSZ, Kenneth W. Huggett, North Caldwell, NJ  
 K8UKM, Elizabeth M. Isham, Columbus, OH  
 W8ZCK, William T. Price, Westerville, OH  
 W9BCP, Casimir A. Pazera, Chicago, IL  
 KB9CLN, Howard F. Richmond, Rock Falls, IL  
 W9ECS, Willis A. Blaisdell, Freeport, IL  
 AA9GJ, Donna C. Shinabarger, Daleville, IN  
 KB9HBR, William B. Brown, Edwardsville, IL  
 W9HCU, Clarence W. Equitz, Lodi, CA  
 K9HPT, Lars B. Hallberg, Minocqua, WI  
 N9ICE, Jack F. Palladay, Indianapolis, IN  
 \*W9KJF, Gene Van Sickel, Indianapolis, IN  
 W9QLG, Arthur G. Leitner, Tell City, IN  
 \*KC9RC, Gerald A. Fox, Mahomet, IL  
 N9VCY, Michael D. Owens, Belleville, IL  
 WA9WKH, Daniel F. Rubinas, Brooksville, FL  
 \*W9WYN, Jack O. Miller, Brookfield, IL  
 N9ZFB, Glen M. Fletcher, Sharpsville, IN  
 KO0A, Raymond C. Richardson, Lyons, KS  
 N0AZW, Marvin E. Nebel, Jefferson City, MO  
 \*N0AZY, James E. Neely, Springfield, MO  
 KA0CPS, Richard H. Kouns, Pueblo, CO  
 W0CSO, Charles Hildebrand, Shawnee, KS  
 K0CXJ, Jon L. Lunder, Detroit Lakes, MN  
 \*WD0EMQ, John E. Tipton, Rapid City, SD  
 WA0IOK, Kenneth B. Barclay, Sun City West, AZ  
 N0JAS, Michael P. Miller, Des Moines, IA  
 K0KDX, Floyd L. Finley, Topeka, KS  
 W0ME, Maurice T. Baer, Salina, KS  
 W0OEX, Elmer L. Castrodale, Mount Pleasant, IA  
 NR0Z, Donna M. Parrill, South Sioux City, NE  
 G2GV, H. A. Moston, Van Nuys, CA  
 VK4IT, R. A. Wilson, Northgate, Australia

### \*Life Member, ARRL

Note: Silent Key reports must confirm the death by one of the following means: a letter or note from a family member, a copy of a newspaper obituary notice, a copy of the death certificate, or a letter from the family lawyer or the executor. Please be sure to include the amateur's name, address and call sign. Allow several months for the listing to appear in this column.

Many hams remember a Silent Key with a memorial contribution to the ARRL Foundation. If you wish to make a contribution in a friend or relative's memory, you can designate it for an existing youth scholarship, the Jesse A. Bieberman Meritorious Membership Fund, the Victor C. Clark Youth Incentive Program Fund, or the General Fund. Contributions to the Foundation are tax-deductible to the extent permitted under current tax law. Our address is: The ARRL Foundation Inc., 225 Main St., Newington, CT 06111.

QST



"Three Wise Men" for the upcoming transatlantic tests on the cover of *QST*, December of 1922.

tomobile, using a three-tube design and a big loop that runs front to back along his car's full length.

## December 1947

♦ The cover shows a young ham using a homebrew receiver with a built-in code oscillator for practice, which is featured in the article "Building a Code-Practice Receiver," by Richard Smith, W1FTX. The editorial discusses the current shortage of spectrum space, with the opening sentence, "The radio world most desperately needs more spectrum space"—a perennial problem.

Kenneth Norton discusses "Sunspots and Very-

High-Frequency Radio Transmission." Phil Rand, W1DBM, tells about "The Q5-er," an outboard circuit to perform a second conversion from a receiver's IF to a second IF at a lower frequency, where selectivity can be improved dramatically. Cal Hadlock, W1CTW, tells how to convert 144 Mc. gear to 235 Mc. in "Let's Start Right on 1 1/4!" Katashi Nose, KH6IJ, ex-K6CGK, tells about "A 40-Pound 14-Mc. Four-Element Beam." "Winds, Waves and Snakes," by National Emergency Coordinator Albert Hayes, WIIN, reports on amateur participation in the September 1947 Florida peninsula-Gulf Coast hurricane.

## December 1972

♦ The cover shows the Oscar 6 ham satellite in W3GEY's backyard, as it is being tested in the sunlight for the first time. The editorial discusses FCC Docket 19245, "the so-called Eyebank matter," which clarifies the rules regarding hams' handling of traffic for third parties. The Docket was discussed further in "Happenings of the Month."

Jon Hagen, W7URZ/KP4DNH, describes "A Simple Frequency Counter for Receivers." Lew McCoy, W1ICP, writes about "Operating Hints for the Novice." Robert Glorioso, W1EBW, speaks of "New Life for the Heath VF-1 VFO," converting it to solid-state operation. Part 1 of "ATV with the Motorola T 44 UHF Transmitter," by F. R. McLeod, W0MZL/9, stirs up interest in the young field of ATV. HQ's Doug DeMaw, W1CER, presents "Notes on Custom-Built Repeater Gear." An article by HQ staffers discusses the addition of "A Daylight National Traffic System" to augment the existing nighttime NTS.—Al Brogdon, WIAB

QST

# Contest Corral

Edited by Bev Fernandez, N1NAV • Assistant Contest Manager

Happy Holidays to all! December is here and so are two great contests: the 160 and 10-meter competitions. With winter weather creeping in, it's a great time to keep warm by the radio. Don't miss these two great contests!

And don't forget: Send in your entries for the ARRL International EME Competition. This year we're offering EME pins for making just one contact. The pins are only \$5. Send for yours today.

Next month we have two popular events, the ARRL RTTY Roundup and the January VHF Sweepstakes. They're both announced in this issue.

## Qualifying Runs

December W1AW Qualifying Runs are at 10 PM EST Dec 1, and at 9 PM EST Dec 16. The West Coast Run will be at 9 PM PST Dec 3. See the W1AW Schedule in this issue for details.

## December 5-7

**ARRL 160-Meter Contest**—See November *QST*, p 107.

## 7-8

**QRP ARCI Holiday Spirits Homebrew Sprint**, CW, sponsored by QRP ARCI, 2000-2400Z December 7. CW only. Single band, all band, high band (20, 15, 10, 6 meters) or low band (160, 80, and 40 meters). Work stations once per band. Exchange RST, state/province/DXCC country, and QRP ARCI number if member (nonmembers send power output). 1.810 3.560 3.710 7.040 7.110 14.060 21.060 21.110 28.060 28.110 50.060. Score 5 pts/QSO with ARCI member, 2 pts/QSO w/non-members in the same continent and 4 pts/QSO with non-members in different continents. Bonus points: add 2000 pts/band for each HB XMTR, 3000 pts/band for each HB RCVR, and 5000 pts/band for each HB XCVR used. Final score is QSO points  $\times$  states/provinces/DXCC countries worked per band  $\times$  power multiplier ( $>5$  W,  $\times 1$ ;  $<5$  W,  $\times 7$ ;  $<1$  W,  $\times 10$ ;  $<250$  mW,  $\times 15$ ), plus bonus points. Send entries by January 2 to QRP ARCI Contest Manager, Cam Hartford, N6GA, 1959 Bridgeport Ave, Claremont CA 91711, or e-mail them to [CamQRP@cyberg8t.com](mailto:CamQRP@cyberg8t.com). See the QRP ARCI Web site at <http://rtpnet.org/~qrp/>.

**TOPS Activity 3.5 MHz CW Contest**, 1800Z Dec 6 until 1800Z Dec 7. 80 meters only, 3.510-3.560. Single operator, Single operator QRP ( $<5$  W),

multioperator. Exchange RST and serial number; TOPS members also give membership number. Score 1 pt/QSO w/own country (W/VE/VK/PY/IA/U call areas count as separate countries); 2 pts/QSO w/other countries in the same continent, 6 pts/QSO w/other continents or /MM stations. Add 2 bonus pts/QSO w/TOPS member; 6 pts/QSO between TOPS members; and 10 pts/QSO w/GB6AQ. Multipliers are prefixes. Final score is QSO points  $\times$  bonus points  $\times$  multipliers. Awards. Send logs by Jan 31 to Helmut Klein, OE1TKW, Nauseagasse 24/26, A-1160 Wien, Austria.

## 13-14

**ARRL 10-Meter Contest**, see November *QST*, p 108.

## 20-21

**Croatian CW Contest**, sponsored by Hrvatski Radioamaterski Savez, 1400 UTC Dec 20 to 1400 UTC Dec 21. CW only. Categories, single operator, multioperator and SWL. Exchange is RST + ITU zone. Points, 10 pts with contacts with 9A stations on 1.8/3.5/7MHz, 6 points on 14/21/28MHz, 6 points with other continent on 1.8/3.5/7MHz, 3 points on 14/21/28MHz, 2 points with own continent on 1.8/3.5/7MHz, 1 point on 14/21/28MHz. Multipliers, DXCC countries plus WAE list on each band 1 point. Final score sum of QSO points from all bands multiplied with sum of multipliers from all bands. Certificates will be awarded. Mail logs within 30 days to Hrvatski Radioamaterski Savez, Croatian CW Contest, Dalmatinska 12, 10000 Zagreb, Croatia.

## 27-28

**Stew Perry Topband Distance Challenge**, 1500Z Dec 27 until 1500Z Dec 28. 160 meters, CW only. Single operator, multioperator, single transmitter. Exchange grid square, RST (optional). QSO points equal the distance between contacts in km. Count additional point for every 500 km QSO. Final score is QSO points  $\times$  power multiplier ( $>100$  W,  $\times 1$ ;  $<100$  W,  $\times 2$ ;  $<5$  W,  $\times 4$ ). Awards. Send log by Jan 28 to Boring ARC, 15125 SE Bartell Rd, Boring, OR 97009.

**RAC Winter Contest**, sponsored by Radio Amateurs of Canada, 0000-2400Z Dec 28. CW and phone. Work stations once per band and mode. QSOs must be made in their respective subbands. No repeater QSOs. Single operator, Single operator QRP (maximum 5 W output) all band or single band; single operator, all band low power (100 W); multioperator. Send RS(T) and serial no. (VE stations exchange RS(T) and Province or Territory).

CW—25 kHz up from the band edges; phone—1.850 3.775 14.175 21.250 28.500. Score 2 pts/QSO outside VE; 10 pts/QSO with VE; and 10 pts/QSO with RAC official stations using "RAC" suffix (ie, VE2RAC, VE6RAC, VY2RAC, etc). Multipliers are Canadian provinces and territories (maximum 12) per mode per band. Final score is QSO pts  $\times$  multipliers. Awards. Send logs by Jan 31 to RAC Contest Committee, 720 Belfast Rd, #217, Ottawa ON K1G 0Z5, Canada. See the Winter Contest site at <http://www.rac.ca/CANWIN.htm>.

## 31

**ARRL Straight Key Night**, 24-hour period UTC (from 7 PM EDT Dec 31 until 7 PM EST Jan 1). This is a friendly CW meeting on the air using straight keys. Suggested areas of operation on 80, 40, and 20 meters are 60 to 80 kHz from the lower band edges and 10 kHz from the lower Novice/Technician Plus band edges. When participating in Straight Key Night, use "SKN" instead of "RST" preceding the three-digit report to clue in passers-by. When the event is over, send a list of stations worked and your vote for best fist heard (not necessarily one you've worked) and most interesting QSO during that period. This is not a contest; quick and contest-like exchanges are discouraged. Mail your report by January 10 to ARRL Headquarters.

## January Events

3-4	<b>RTTY Roundup</b>
3-4	Northern New York Section QSO Party
10-11	Hunting Lions in the Air Contest
17-19	<b>ARRL January VHF Sweepstakes</b>
24-26	CQ WW 160-Meter DX Contest, CW
31- Feb 1	YL International CW QSO Party

Contest Announcements: Items for this column can be sent on an MS-DOS disk in ASCII format, via modem (860-594-0306), via fax (860-594-0259), via Internet ([to contest@arrl.org](mailto:to contest@arrl.org)) or in letter form. Submissions must be received no later than the 1st of the second month preceding the publication date; ie, a contest in March would have to be received by January 1.

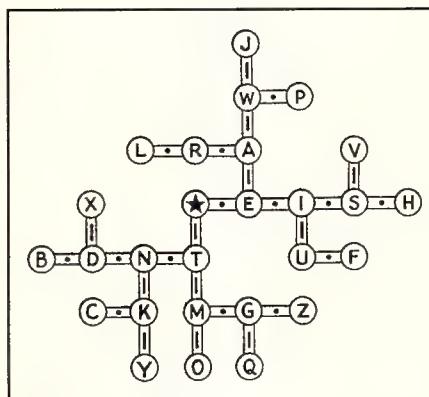
**DST**

# Strays

## BLAST FROM THE PAST

◊ Thomas Hedges, W8BKE, came up with a neat idea that was published in the February 1934 issue of *QST*, to help people learn to copy Morse code. The idea was so good that we again present it for our readers' amazement and amusement.

When starting to learn the code and working at copying perhaps 5 WPM, just place your pencil on the star at the center of the graphic shown below. When you



hear a dit, move your pencil in a horizontal direction along the lines; for a dah, move it vertically. When you have "traced" the path of all the dits and dahs of the character, your pencil will be pointing at the letter they represent. Someone who knows *nothing* about Morse code can be quickly trained to recognize the difference between a dit and a dah, and in a first session can be translating (not really "copying") at a 5 WPM rate. A few practice sessions later, he or she will be learning the individual characters because of the repetition.

Give it a try. This shows that the KISS principle really works (Keep It Simple, Stupid!).

Edited by Bev Fernandez, N1NAV • Assistant Contest Manager

**Bethlehem, CT:** Hen House Gang AR, W1FHP, 0000Z Dec 1 to 2400Z Dec 31, Christmas from Bethlehem, 7.108 7.250 14.040 14.325. QSL. Robert O'Neil, W1FHP, 283 Hard Hill Rd N, Bethlehem, CT 06751.

**Iowa City, IA:** ICARC and the University of Iowa ARC, W0IO, 1400Z-2300Z Dec 6, 150th Anniversary of Iowa University, 7.250 14.250 21.300 28.400. Certificate. ICARC, Box 0004, Iowa City, IA 52244-0004.

**Baltimore, MD:** Historic Electronics Museum ARC, W2W, 1500Z Dec 6 to 2100Z Dec 7, Attack on Pearl Harbor, 7.245 7.115 14.245 14.045. Certificate. Historical Electronics Museum, MS 4015, W2W, Box 746, Baltimore, MD 21203.

**Homestead, FL:** The Everglades ARC, W4SVI, Dec 6-7, 50th anniversary of Everglades National Park, 7.225 14.225 21.350 28.310. Certificate. Everglades ARC, c/o Scott Buell, 15380 SW 151 Tr, Miami, FL 33196.

**Mesa, AZ:** EVARG, WA7USA, 1500Z Dec 6 to 2400Z Dec 7, Commemoration of the USS Arizona, 14.240 21.340 2 meters. Certificate. EVARG, 3264 E Carol Ave, Mesa, AZ 85204-3245.

**Bethlehem, IN:** Clark County ARC, W9WWI, 1500Z Dec 12 to 2200Z Dec 13, Christmas Season, 3.900 7.200 7.050. Certificate. CCARC, W9WWI, 1805 E 8th St, Jeffersonville, IN 47130.

**St Johnsbury, VT:** St Johnsbury Academy Wireless, KB1BPR, 1300Z-1900Z Dec 13, 155 years of the Academy, 7.285 14.285 28.385 28.485. Certificate. St Johnsbury Academy, Bruce Burk, 7 Main St, St Johnsbury, VT 05819.

**Kenosha, WI:** Lakeshore Repeater Assn, N9LTA, 1500Z-2100Z Dec 13, Carthage College sesquicentennial, 7.125 28.445 50.150 146.520. Certificate. Carthage College Computer Center, 2001 Alford Park Dr, Kenosha, WI 53140-1994.

**Santa Claus, IN:** The Legion of Indianapolis DXers, W9IND, 1500Z-2200Z Dec 13, and Dec 14, Christmas, 7.280 14.280 21.380 28.380. Certificate. Brian Smith, W9IND, 143 Tracy Ridge Blvd, New Whiteland, IN 46184.

**Edgewater/New Smyrna Bch, FL:** Coronado Wireless Assn ARC, KE4AG, 1400Z Dec 13, 2100Z Dec 14, 17th Annual Christmas Event, 7.250 14.250 21.325 28.325. Certificate, QSL. Donald Benham, KE4AG, 316 S Ridgewood #35, Edgewater, FL 32141.

**Seneca, IL:** Starved Rock RC, W9MKS, 1400Z Dec 13 to 0400 Dec 15, 55th Anniversary of the first LST Launch from Seneca Prairie Shipyard, 3.555 7.055 14.055 21.355. QSL. SRRC, Box 198, Leonore, IL 61332.

**Bethlehem/Nazareth, PA:** Christmas City ARC/Delaware Lehigh ARC, WX3MAS, 1400Z-0200Z Dec 13-14 and Dec 14-15, Annual Christmas City Event, 3.965 7.265 14.265 21.365. Certificate. DLARC, WX3MAS, RR4 Greystone Bldg, Nazareth, PA 18064-9211.

**Waco, TX:** Central Texas HF Society, 1600Z Dec 13 to 2400Z Dec 20, 142nd anniversary, Phone and CW 40-10, 146.58. Certificate. Larry Merritt, KC5BFM, Box 3501, Waco, TX 76707.

**Belen, (Bethlehem), NM:** Valencia County ARA, KC5OUR, 1400Z Dec 20 to 2359Z Dec 28, Christmas season from Bethlehem, NM. 75 KHz

from top of each band. QSL. VCARA, Box 268, Peralta, NM 87042.

**Fullerton, CA:** Fullerton RC, W6ULI, 0030Z-0700Z Dec 31, Nonalcoholic New Year, 7.020 14.330 21.330 28.400. Certificate. FRC, Box 545, Fullerton, CA 92836.

**Rockford, IL:** Rockford ARA, W9AXD, 1900Z-2300Z Dec 31, Rockford's New Year Celebration, 3.875 3.700 7.140 14.265. QSL. Jeffrey Anderson, 1014 Fieldcrest Dr, Rockford, IL 61108.

**Certificates and QSL cards:** To obtain a certificate from any of the special-event stations offering them, send your QSO information along with a 9×12-inch self-addressed, stamped envelope to address listed in the announcement. To receive a special event QSL card (when offered), be sure to include a self-addressed, stamped business envelope along with your QSL card and QSO information.

**Special Events Announcements:** For items to be listed in this column, you must be an Amateur Radio Club, and use the ARRL Special Events Listing Form. Copies of this form are available via Internet ([info@arrl.org](mailto:info@arrl.org)), the ARRL BBS (860-594-0306), or for a SASE (send to Special Requests, ARRL, 225 Main St, Newington, CT 06111, and write "Special Requests Form" in the lower left-hand corner. Entries must be received by ARRL HQ no later than the 1st of the second month preceding the publication date; ie, a special event listing for Jan QST would have to be received by Nov 1. Entries may be sent on an MS-DOS floppy disk in ASCII format; fax at 860-594-0259; via modem (860-594-0306); via Internet ([to contest@arrl.org](mailto:contest@arrl.org)); or in letter form.

**QST**

## New Products

### LOG-PERIODIC DIPOLE ARRAY ANTENNAS FROM TENNADYNE

◊ A trio of rotatable log-periodic dipole arrays (LPDA) have been added to Tennadyne's broad line of directional antennas. The Model T8-1030 is an 8-element array that covers 10 to 30 MHz; the T6-2014—first described in December 1976 *QST*—is a 6-element Log-Yag for 20 meters (monobanders for other ham bands are available); and the T7-1830, a 7-element LPDA designed as a companion to the T6-2014, covers 18 to 30 MHz.

Prices: T8-1030, \$975; T6-2014, \$895; T7-1830, \$495. For more information, contact Tennadyne, HC 81, Box 347A, Junction, TX 76849; tel/fax 915-446-4510, e-mail [tennadyne@juno.com](mailto:tennadyne@juno.com).

### VINTAGE COLLINS COLLECTOR VIDEOS FROM HI-RES

◊ Collectors should be happy to note the availability of three additions to Hi-Res

Communications' Collins Video Library. Hosted by R-390A expert Chuck Rippel, WA4HHG, the *R-390A Video* is a seven-hour seminar on every aspect of selecting, operating, maintaining and restoring this venerable receiver. The *75A-4 Video* (four hours) and the *KWS-1 Video* (two hours) cover similar topics and are hosted by Collins expert Butch Schartau, K0BS.

Prices: 390A, \$109.95; 75A-4, \$89.95, KWS-1, \$39.95. Purchase three or more videos for a 10% discount. VISA/MC accepted. For more information, contact Floyd Soo, W8RO, Hi-Res Communications, 8232 Woodview Dr, Clarkston, MI 48348; tel/fax 248-391-6660, e-mail [hiresh@rust.net](mailto:hiresh@rust.net); <http://www.rust.net/~hiresh>.

### HAM IV ROTATOR CABLE ASSEMBLIES FROM CABLE X-PERTS

◊ Designed to fit Hy-Gain HAM IV rotators, Cable X-perts' new 8-conductor rotator cable assemblies come complete with factory installed "Jones" plugs and sockets. Each termination is soldered and tested for mechanical and electrical integrity.

Prices: 125-foot assembly, \$34.95; 200-foot assembly, \$84.95. Custom lengths can be supplied. Shipping is extra. For more

information, contact Cable X-perts, 416 Diens Dr, Wheeling, IL 60090; tel 800-828-3340, fax 847-520-3444, e-mail [cxp@ix.netcom.com](mailto:cxp@ix.netcom.com); <http://www.cablexperts.com>.

### FLEXIBLE CTCSS ENCODER/DECODER MODULE FROM HAMTRONICS

◊ The TD-5 CTCSS tone encoder/decoder module is now available with expanded instructions and application notes. The module, which can be easily adapted for use with almost any transceiver or repeater, features crystal-controlled accuracy and several tone-selection options.

Single tones can be set with a simple DIP switch. If several tone combinations are required, the supplied applications manual details how to configure a front-panel switch to choose among several tone presets. Other features include adjustable deviation, muting, and a high-pass audio filter (when used as a decoder).

Price: \$39, kit; \$59, wired and tested. For more information, contact Hamtronics, 65-Q Moul Rd, Hilton, NY 14468; tel 716-392-9430 <http://www.hamtronics.com>.

**QST**

# General Rules for All ARRL Contests



The Rules for ARRL Contests have been reorganized. On this and following pages you'll find general rules that apply to all ARRL contests, rules for contests on bands below 30 MHz, and on bands above 50 MHz. The reorganization makes the rules consistent between contests. This results in some changes. You'll want to read this carefully, and you'll want to save this issue of *QST* for future reference.

With the general rules you'll find specific rules for Straight Key Night, January VHF Sweepstakes, RTTY Roundup, and the International DX Contest.

Rules for all 1998 ARRL contests will be available soon in the *ARRL 1998 Contest Yearbook* and on the ARRL Web site. —*Chuck Hutchinson, K8CH, Membership Services Manager*

## 1. Precedence of Rules:

1.1. Rules for individual contests or events (including Field Day) take precedence over all General Rules.

1.2. General Rules for HF and VHF contests take precedence over General Rules for all contests.

## 2. Conditions of Entry: Entrants agree to be bound by:

2.1. The provisions, and intent, of ARRL contest rules.

2.2. The regulations of their licensing authority.

2.3. The decisions of the ARRL Awards Committee.

## 3. General Rules:

3.1. All operators must observe the limitations of their operator licenses and station licenses at all times.

3.2. Call signs and exchange information must be sent, received, acknowledged, and logged correctly by each station for a complete QSO.

3.3. One operator may not use more than one call sign from any given location during the contest period.

3.4. The same station may be worked only once per band for contest credit.

3.5. A transmitter used to contact one or more stations may not be subsequently be used under any other call during the contest period, except for family stations where more than one call has been issued, and then only if the second call sign is used by a different operator. (The intent of this rule is to accommodate family members who must share a rig, and to prohibit manufactured or artificial contacts.)

3.6. All transmitters and receivers must be located within a 500-meter-diameter circle, excluding antennas.

3.6.1. This prohibits the use of remote receiving installations.

3.6.2. Exceptions:

3.6.2.1. Stations remotely controlled by radio link may use necessary equipment at the control point. This does not include using the control point as another receiving location.

3.6.2.2. Multi Operator and Single Operator Assisted stations may use spotting nets.

3.7. Cross-band contacts are not permitted.

3.8. Contacts made through repeaters, digipeaters, and gateways are not permitted.

3.8.1. This applies to all forms of active relays or repeaters.

3.8.2. Satellite contacts, where allowed, are not subject to this rule.

3.9. The use of non-Amateur Radio means of communication (for example, Internet or telephone) to solicit a contact (or contacts) during the contest period is not permitted.

3.10. Entrants who qualify for unsponsored plaques may purchase them from the ARRL Contest Branch.

## 4. ARRL Standard File Format: For Electronic Submission of Contest Entries.

4.1. All files must be in standard ASCII text format.

4.2. The log data file name shall consist of the call sign and the extension ".LOG" for example, K5ZD.LOG

4.3. The summary sheet file name shall consist of the call sign and the extension ".SUM" for example, K5ZD.SUM

4.4. Electronic entries should be sent via Internet to [contest@arrl.org](mailto:contest@arrl.org)

4.4.1. They may be uploaded to the ARRL BBS (860-594-0306).

4.4.2. They may be sent by mail to: ARRL Contest Branch, 225 Main St., Newington, CT 06111.

4.4.2.1. Use an MS-DOS formatted disk, 3.5-inch (720-KB or 1.44-MB).

4.4.2.2. Diskette labels should clearly indicate the call sign used, contest name, entry class, and date of the contest.

4.4.2.3. Include one entry only on each diskette.

4.4.2.4. All diskettes become the property of the ARRL and are not returnable.

4.4.3. They may be sent by Anonymous FTP to [ftp.arrl.org/logs](ftp://ftp.arrl.org/logs)

4.4.3.1. If you use a non-Web-browser FTP client, FTP to [ftp.arrl.org](ftp://ftp.arrl.org) and change directory to /logs, with the command cd /logs.

4.4.3.2. Logs received by FTP are not acknowledged by e-mail unless an e-mail message of inquiry is sent to [contest@arrl.org](mailto:contest@arrl.org)

4.5. The log file must consist of one line of data per QSO (no more than 80 characters wide), without headers, footers, page breaks or other non-ASCII characters.

4.6. All QSO data must appear in each line, aligned by columns, and must include:

4.6.1. band: wavelength for HF and frequency for VHF.

4.6.2. mode: designator such as CW, PH, etc.

4.6.3. date: in MM/DD/YY or DD/MM/YY format.

4.6.4. time: 4-digit UTC without colons.

4.6.5. call sign of station worked.

4.6.6. complete exchange sent.

4.6.7. complete exchange received.

4.6.8. indication of multipliers: for example an asterisk (\*), section/prefix/zone, etc. for the first time the multiplier is contacted.

4.6.9. points claimed: ALL unclaimed QSOs must be "0" points.

## Rules, ARRL Straight Key Night

**1. Object:** This is a friendly meeting on the air using straight keys. Suggested areas of operation of 80, 40, and 20 meters are 60 to 80 kHz from the lower band edges and 10 kHz from the lower Novice-band edges.

**2. Date and Time:** 24 hours UTC, from 7 PM EST December 31, until 7 PM EST January 1.

**3. Exchange:** When participating in SKN, use SKN instead of RST preceding the three-digit number to clue in passers-by.

**4. Miscellaneous:** This is not a contest; quick, contest-like exchanges are discouraged.

**5. Reporting:** Following SKN, send a list of stations worked, plus your vote for the best first heard (not necessarily one you've worked) and the most interesting QSO you had to ARRL HQ by January 10.

4.7. Multi Operator, Two Transmitter category logs must indicate which transmitter made each QSO.

4.8. In contests that require rest periods, the "times on" and "times off" must be in a separate column.

4.9. A summary sheet is required with all logs, either an official ARRL summary sheet or a close facsimile with a signed contest participation disclaimer. The disclaimer is a statement of acceptance of the conditions of entry.

4.9.1. Electronic entries should include a summary file instead of a paper summary sheet. (The signature is not necessary on an electronic summary sheet (see Rule 2).

4.9.2. All summary sheets must include all pertinent information from, or requested on, the official summary sheet for the particular contest.

## 5. Paper logs:

5.1. Entrants must use ARRL contest forms, or reasonable facsimiles.

5.2. Contest forms are available:

5.2.1. In the *ARRL Contest Yearbook* (available from the publications sales office of ARRL HQ)

5.2.2. For download at: <http://www.arrl.org/contests/>

5.2.3. By e-mail to [info@arrl.org](mailto:info@arrl.org), include the following in the message body (the subject line is ignored):

help  
index  
quit

5.3. Paper entries with more than 500 QSOs total must include cross-check sheets (dupe sheets).

## 6. Reporting:

6.1. Entries must be sent to ARRL within 30 days after each contest weekend. For paper entries, this is determined by the postmark.

6.2. Logs not sent by the contest deadline will be classified as checklogs; no extensions, no exceptions.

6.3. Entries received at ARRL more than 30 days after the contest deadline may not be included in *QST* listings.

6.4. All stations are requested to send their entries as early as possible and enclose each entry physically sent to ARRL (for example,

CW and phone) in a separate envelope. Electronic files may all be attached to the same message.

6.5. To be complete, entries must consist of the log and summary sheet. (For electronic entries, you may ZIP the summary sheet file and the log file together using *PKZIP.EXE* or its equivalent, and upload your compressed file or upload the files separately.)

6.6. All operators of multi operator stations must be listed.

6.7. Entrants may submit contest entries as described in Rule 4.4

6.7.1. Entries sent by mail to: ARRL Contest Branch, 225 Main St., Newington, CT 06111, whether on diskette or paper, should include a paper summary sheet and signed disclaimer statement.

## 7. Disqualification and Penalties:

7.1. If the claimed score of a participant is reduced by 2% or more, the entry may be disqualified. Score reduction does not include correction of arithmetic errors.

7.2. Score reduction may be made for taking credit for unconfirmed QSOs or multipliers, duplicate contacts or other scoring discrepancies.

7.3. An entry with more than two-percent duplicate contacts left in the log or an entry in which more than 2% "rubber clocking" (altering the actual time to increase the operating time so that it is greater than the allowable limit) is detected will be automatically disqualified.

7.4. Participants that are disqualified will be barred from submitting an entry in the next annual running of that specific contest, for example, disqualification from the 1998 phone SS prohibits submission of an entry for the 1999 phone SS, but 1999 CW SS participation is allowable.

7.5. Call signs of all disqualified participants will be listed in the *QST* contest report.

7.6. Any participant on the borderline of disqualification, but not actually disqualified, may receive a warning letter.

7.7. For each duplicate contact that is claimed for credit and each miscopied call sign that is removed from the log by HQ, three additional contacts will be deleted as a penalty. The penalty will not be considered part of the 2% disqualification criteria.

7.8. In all cases of question, the decisions of the ARRL Awards Committee are final.

## Rules, 1998 ARRL RTTY Roundup

**1. Object:** Amateurs worldwide contact and exchange QSO information with other amateurs using digital modes (Baudot RTTY, ASCII, AMTOR, and Packet—attended operation only) on 80, 40, 20, 15, and 10 meter bands. Any station may work any other station.

**2. Date and Contest Period:** First full weekend of January, but never on January 1. Begins 1800 UTC Saturday, ends 2400 UTC Sunday (January 3-4, 1998).

2.1. Operate no more than 24 hours.

2.2. Two rest periods (for a combined total of at least 6 hours) must be taken in two single blocks of time, clearly marked in the log.

### 3. Entry Categories:

3.1. Single Operator:

3.1.1. Low Power.  
3.1.2. High Power.

3.2. Multi Operator, Single Transmitter (only).

### 4. Exchange:

4.1. United States: Signal report and State.

4.2. Canada: Signal report and Province.

4.3. DX: Signal report and serial number, starting with 001.

### 5. Scoring:

5.1. QSO Points: Count one point for each completed QSO.

5.2. Multipliers: Each US state (except KH6 and KL7), each VE province (plus VE8 and VY1) and each DXCC country. KH6 and KL7 count only as separate DXCC countries.

5.2.1. Count only once (not once per band).

5.2.2. The US and Canada do not count as DXCC countries.

### 6. Miscellaneous:

6.1. Packet radio contacts made through digipeaters or gateways are not permitted.

### 7. Awards:

Certificates will be awarded to:

7.1. Top high power and low power Single Operator and Multi

Operator scorers in each ARRL/RAC Section.

7.2. Top high power and low power Single Operator and Multi Operator scorers in each DXCC country (other than W/ VE).

7.3. Each Novice and Technician Plus entrant.

7.4. Each entrant making at least 50 QSOs.

**8. Other:** See rules for All ARRL Contests and for HF Contests.

### Recommended HF Digital Operating Frequencies (MHz)

North and South America Europe/Africa

3.590 RTTY DX 3.580-3.620

3.605-3.645

7.040 RTTY DX 7.035-7.045

7.080-7.100

14.070-14.099.5

14.080-14.099.5

21.070-21.100 21.080-21.120

28.070-28.150 28.050-28.150

### Recommended Novice Digital Operating Frequencies

10 meters: 28.100-28.150\*

Suggested simplex packet-

radio frequencies:

28.102.3

28.104.3

\*Authorized power output

200-watts maximum for

Novices/Techs only in the

10-meter Novice subband.

### Canadian Multipliers

Prefix Province

VO1, VO2 NF, (LB)

VE1, 9 NB

VE1 NS

VE2 QC

VE3 ON

VE4 MB

VE5 SK

VE6 AB

VE7 BC

VE8 NT

VY1 YT

VY2 PE

## 8. Club Competition:

8.1. Five ARRL-sponsored contests include an ARRL affiliated club competition:

- 8.1.1. January VHF Sweepstakes
- 8.1.2. (February and March) International DX Contest
- 8.1.3. November Sweepstakes
- 8.1.4. (December) 160-Meter Contest
- 8.1.5. (December) 10-Meter Contest

8.2. Only clubs actively affiliated with the ARRL may participate in the club competition. This means the club:

- 8.2.1. is affiliated with the ARRL.

8.2.2. has filed an annual report with the Field Services Department of ARRL HQ within the last two years.

8.3. For a club to be listed, the following conditions must be met:

8.3.1. At least three different entries from members of the club must be submitted.

8.3.2. All members wishing to be included in the club score must indicate the club name on their summary sheet.

8.3.3. The club secretary must send a list of all club members eligible to compete for the club (not a club roster) and which level (unlimited, medium, local) they wish to enter for each competition within 30 days after the contest.

8.3.4. A member's score must be shown in the contest results to be counted for a club. Only that score shown in the results (or in subsequent corrections) will count for the club competition.

8.4. There are three categories of club competition:

- 8.4.1. **Unlimited**

- 8.4.1.1. Club submits 51 or more entries.

8.4.1.2. One station can submit two entries—one on CW and one on phone in the November Sweepstakes and the DX Contest.

- 8.4.1.3. All stations and all operators must reside within 175

miles (282 km) of the club's center.

8.4.1.4. All members must attend at least 2 club meetings per year to be eligible to submit an entry. (If, however, they have not been a member for a year's time, they must have attended a meeting as a member prior to the contest.)

8.4.1.5. Those club members who are disabled in such a way that they are unable to travel are exempt from the two meetings per year rule but they must be regularly active in club affairs.

8.4.1.6. To be considered bona fide, a member must be active in club affairs.

8.4.1.7. Members living outside of 175 miles and members operating stations outside 175 miles may not compete in the club competition. (See rule 8.6.)

## 8.4.2. Medium

8.4.2.1. Club submits 50 or fewer entries and does not qualify under the local club criteria.

8.4.2.2. One station can submit two entries—one on CW and one on phone in the November Sweepstakes and the DX Contest.

8.4.2.3. The same mileage and attendance requirements apply as the unlimited class club.

8.4.2.4. Members living outside of 175 miles and members operating stations outside 175 miles may not compete in the club competition. (See rule 8.6.)

## 8.4.3. Local

8.4.3.1. Club submits 10 or fewer entries.

8.4.3.2. One station can submit two entries—one on CW and one on phone in the November Sweepstakes and the DX Contest.

8.4.3.3. All members must reside and operate within 20 miles of the club's center.

8.4.3.4. There is no attendance requirement.

8.4.3.5. Members living outside of 20 miles (32 km) and

## Rules, 1998 ARRL International DX Contest

### 1. Object:

1.1. W/VE amateurs work as many amateur stations in as many DXCC countries of the world as possible on 160, 80, 40, 20, 15, and 10 meter bands.

1.2. Foreign amateurs (including KH6, KL7, CY9, and CY0) work as many W/VE stations in as many of the 48 contiguous states and provinces as possible.

### 2. Date and Contest Period:

2.1. CW: Third full weekend in February (February 21-22, 1998).

2.2. Phone: First full weekend in March (March 7-8, 1998).

2.3. Contest Period: 48 hours each mode (separate contests). Starts 0000 UTC Saturday; ends 2400 UTC Sunday.

### 3. Entry Categories:

3.1. Single Operator:

3.1.1. All Band:

3.1.1.1. QRP.

3.1.1.2. Low Power.

3.1.1.3. High Power.

3.1.2. Single Band (one only). Single-band entrants who make contacts on other bands should submit logs of those contacts for checking purposes.

3.1.3. Single Operator Assisted.

3.2. Multi Operator:

1. Single Transmitter.

2. Two Transmitter.

3. Multi Transmitter.

### 4. Contest Exchange:

4.1. W/VE stations in the 48 contiguous United States and Canada (except in the islands of St Paul and Sable) send signal report and state or province.

4.2. DX stations send signal report and power (three-digit number indicating approximate transmitter output power).

### 5. Scoring:

5.1. QSO Points—W/VE stations count three points per DX QSO. DX stations count three points per W/VE QSO.

5.2. Multiplier—W/VE stations: Sum of DXCC countries (except US and Canada) worked per band. DX stations: Sum of US states (except KH6/KL7) and District of Columbia (DC), NB (VE1, 9), NS

(VE1), QC (VE2), ON (VE3), MB (VE4), SK (VE5), AB (VE6), BC (VE7), NT (VE8), NF (VO1), LB (VO2), YT (VY1), PE (VY2) worked per band. Maximum of 62 per band.

5.3. Final Score—QSO points  $\times$  multiplier = final score.

### 6. Miscellaneous:

6.1. Your call sign must indicate your DXCC station location (KH6XYZ/W1 in Maine, FS/FGOAAA on St Martin, etc).

6.2. The same station may be worked only once per band—no crossmode or repeater contacts.

6.3. Aeronautical and maritime mobile stations outside the US and Canada may be worked by W/VE stations for QSO credit only.

### 7. Awards:

7.1. Plaques (if sponsored) will be awarded in the following categories for both the CW and phone contests.

7.1.1. Top W/VE scorer in each entry category—single operator—all band-QRP, single operator—all band-low power, single operator—all band-high power, single operator-single band (160-10 Meters), single operator assisted, multi operator-single transmitter, multi operator-two transmitter, multi operator-multi transmitter.

7.1.2. Top scorer in the single operator-all band category worldwide and on each continent. In addition, worldwide leaders in the single operator-all band-QRP, single operator-all band-low power, single operator-single band, single-operator assisted, multi operator-single transmitter, multi operator-two transmitter and multi operator unlimited categories will receive plaques.

7.2. Certificates will be awarded to:

7.2.1. top single operator-all band entries (QRP, low power, and high power) from each country and ARRL/RAC Section

7.2.2. top single-band entries in each US call area and each country

7.2.3. top single operator assisted entries in each country, US call area and in Canada

7.2.4. top multi operator entries (single, two and multi transmitter) in each country, US call area and in Canada

7.2.5. DX entrants making more than 500 QSOs on either mode will receive certificates.

7.2.6. Additional single-band and multi operator certificates will be awarded if significant effort or competition is displayed.

8. Other: See rules for All ARRL Contests and for HF Contests.

members operating stations outside 20 miles may not compete in the club competition. (See rule 8.6.)

8.5. Single Operator and Multi Operator station scores may be counted.

8.5.1. At a guest-operated single-operator station, both the guest operator and the station licensee must be members of the same club in order to count the score for that club.

8.5.2. At multi operator stations, at least 66% of the operators must be members of the same club for the score to count for that club.

8.5.3. A multi operator entry may (optional) utilize non-member operators licensed one year or less without including such operators in the above 66% calculation. (The intent here is to encourage clubs to recruit contestants from newer amateurs without adversely affecting the club aggregate score.)

8.6. For the ARRL International DX Contest, DXpeditions (operating outside the United States and Canada) scores may be counted for either single operator or multi operator stations even though the operation is outside the club's area.

8.6.1. For single guest operators at a DX station, only the operator must be a club member and meet all other criteria.

8.6.2. For multi operator stations, the score counts for only one club and at least 66% of the operators must be members of that club and meet all other criteria.

8.7. In conjunction with the two meetings per year rule, the club must hold at least four in-person meetings per year.

8.8. A club's entry classification may be changed if, in the opinion of the ARRL Awards Committee, the club has manipulated its number of entries to fall into a lower classification (for example, if a club with 100 members submits only the 10 highest scores, even if more than 10 of its members wish to compete.)

8.9. It is not within the intent of these rules that a club should vote out a member or that a member resign and then be voted back into the club later so the member-attendance rule can be met.

8.10. The highest scoring active affiliated club entry in each category (unlimited, medium, local) will be awarded a gavel.

## General Rules for ARRL Contests on bands below 30 MHz (HF)

### 1. General Rules:

1.1. See General Rules for All ARRL Contests.

1.2. Cross-mode contacts are not permitted.

**2. Entry Categories:** The following categories are defined for ARRL contests on bands below 30 MHz. See the rules for each contest to determine which categories apply, and whether additional categories exist for that contest.

**2.1. Single Operator:** One person performs all transmitting, receiving, spotting, and logging functions as well as equipment and antenna adjustments.

2.1.1. Use of spotting assistance or nets (operating arrangements involving other individuals, DX-alerting nets, PacketCluster, etc.) is not permitted.

2.1.2. Single-Operator stations are allowed only one transmitted signal at any given time.

2.1.3. Single Operators may be divided into sub-categories based on power output:

2.1.3.1. **QRP:** 5-W PEP output or less.

2.1.3.2. **Low Power:** 150-W PEP output or less.

2.1.3.3. **High Power:** More than 150-W PEP output.

**2.2. Single Operator Assisted:** One person performs all transmitting, receiving, and logging functions as well as equipment and antenna adjustments.

2.2.1. Use of spotting assistance or nets (operating arrangements involving other individuals, DX-alerting nets, PacketCluster, etc.) not physically located at the station is permitted.

2.2.2. Single Operator Assisted stations are allowed only one transmitted signal at any given time, not including transmissions on a spotting net.

**2.3. Multi Operator:** More than one person performs transmitting, receiving and logging functions, etc. Multi Operator stations may be divided into sub-categories:

**2.3.1. Multi Operator, Single Transmitter:** Stations are allowed only one transmitted signal at any given time

2.3.1.1. In those contests that do not have Single Operator

Assisted class, includes those single operators that use any form of spotting assistance such as from nets or PacketCluster.

2.3.1.2. Includes those that receive assistance with logging or relief operators, etc.

2.3.1.3. Limited to 6 band changes (maximum) in any clock hour.

2.3.1.3.1. The clock hour is from zero through 59 minutes.

2.3.1.3.2. Band changes are defined so that, for example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes.

2.3.1.4. Violation of the 6 band changes rule or improper logging will result in an entry reclassification to the Multi Operator Multi Transmitter class.

#### 2.3.2. Multi Operator, Two Transmitter:

2.3.2.1. A maximum of two transmitted signals at any given time, on different bands.

2.3.2.2. Each transmitter is limited to 6 band changes (maximum) in any clock hour.

2.3.2.2.1. The clock hour is from zero through 59 minutes.

2.3.2.2.2. Band changes are defined so that, for example, a change from 20 meters to 40 meters and then back to 20 meters constitutes two band changes.

2.3.2.3. Violation of the 6 band changes rule or improper logging will result in an entry reclassification to the Multi Operator Multi Transmitter class.

2.3.2.4. Both transmitters may work any and all stations; the second transmitter is not limited to working new multipliers only.

2.3.2.5. Each of the two transmitters must keep a separate, chronological log for the entire contest period.

#### 2.3.3. Multi Operator, Multi Transmitter:

2.3.3.1. A maximum of one transmitted signal per band at any given time.

2.3.3.2. Multi Operator, Multi Transmitter stations must keep a separate, chronological log for each band for the entire contest period.

## General Rules for ARRL Contests on bands above 50 MHz (VHF)

### 1. General Rules:

1.1. See General Rules for All ARRL Contests.

1.2. Individuals and stations are limited to one entry per contest.

1.3. A transmitter, receiver, or antenna used to contact one or more stations may not be subsequently be used under any other call during the contest period, except as provided for in General Rule for All ARRL Contests number 3.5.

1.4. Stations may be worked for credit only once per band from any given grid square, regardless of mode. This does not prohibit working a station from more than one grid square with the same call sign (such as a Rover).

1.5. Crossband QSOs do not count.

1.6. Aeronautical mobile contacts do not count.

1.7. Retransmitting either or both stations, or use of repeater frequencies, is not permitted.

1.7.1. This prohibits use of all repeater frequencies.

1.7.2. Contest entrants may not transmit on repeaters or repeater frequencies for the purpose of soliciting contacts.

1.8. Use of the national simplex frequency, 146.52 MHz, or immediate adjacent guard frequencies is prohibited.

1.8.1. Contest entrants may not transmit on 146.52 for the purpose of making or soliciting QSOs.

1.8.2. The intent of this rule is to protect the national simplex frequency from contest monopolization.

1.8.3. There are no restrictions on the use of 223.50 MHz.

1.9. Only recognized simplex frequencies may be used, such as 144.90 to 145.00; 146.49, .55 and .58, and 147.42, .45, .48, .51, .54 and .57 MHz on the 2-meter band.

1.9.1. Local-option simplex channels and frequencies adjacent to the above that do not violate the intent of the above rules, or the spirit and intent of the band plans as recommended in the *ARRL Repeater Directory*, may be used for contest purposes.

1.10. While no minimum distance is specified for contacts, equipment should be capable of communications at a range of at least 1 km.

1.11. A station located precisely on a dividing line between grid squares must select only one as the location for exchange purposes. A different grid-square multiplier cannot be given out without moving the complete station (including antennas) at least 100 meters.

1.12. Above 300 GHz, contacts are permitted for contest credit only between licensed amateurs using coherent radiation on transmission (for example, laser) and employing at least one stage of electronic detection on receive.

1.13. Marine Mobile (and Maritime) entries will be listed separately as "Marine Mobile" in the listings and compete separately for awards.

1.14. Participants are reminded that the segment 50.100-50.125 MHz should be used for intercontinental QSOs only, using 50.125 MHz as a calling frequency then QSY after contact is established.

**2. Entry Categories:** The following categories are defined for ARRL contests on bands above 50 MHz. See the rules for each contest to determine which categories apply, and whether additional categories exist for that contest.

**2.1. Single Operator:** One person performs all transmitting, receiving, spotting, and logging functions as well as equipment and antenna adjustments.

2.1.1. Use of spotting assistance or nets (operating arrangements involving other individuals, DX-alerting nets, Packet

Cluster, etc.) is not permitted.

2.1.2. Single Operator stations are allowed only one transmitted signal at any given time.

2.1.3. Single Operator stations compete for all-band and single-band awards.

2.1.4. Overall and single-band winners are recognized both in *QST* score listings and in awards offered.

**2.2. Single Operator, QRP Portable:** (not for home stations or fixed stations)

2.2.1. 10-W PEP output or less.

2.2.2. Portable power source.

2.2.3. Portable equipment and antennas.

**2.3. Rover:** One or two operators of a single station that moves among two or more grid squares during the course of a contest.

2.3.1. A rover vehicle may transport only one station using a single call sign.

2.3.2. A rover may not operate with more than one call sign.

2.3.3. Rover vehicles must transport all the equipment, power supplies, and antennas used at each operating site.

2.3.4. Rovers sign "rover" on phone and /R on CW after their call sign.

2.3.5. All Rovers are encouraged to adopt operating practices that allow as many stations as possible to contact them.

2.3.6. Rover operators may submit separate logs for single operator (fixed station) in addition to their rover entries.

**2.4. Multi Operator:** More than one person performs transmitting, receiving and logging functions, etc. Stations must locate all equipment (including antennas) within a circle whose diameter does not exceed 300 meters (1,000 feet). Multi operator stations may be divided into sub-categories:

**2.4.1. Multi Operator (Unlimited):**

**2.4.2. Limited Multi Operator:** Stations submit logs with a maximum of four bands used. (Logs from additional bands used, if any, should be included as checklogs.)

## Rules, 1998 January VHF Sweepstakes

**1. Object:** To work as many amateur stations in as many different 2 degrees  $\times$  1 degree grid squares as possible using authorized frequencies above 50 MHz. Foreign stations work W/VE amateurs only.

**2. Date and Contest Period:** The weekend before the NFL Super Bowl. Begins 1900 UTC Saturday, ends 0400 UTC Monday (January 17-19, 1998).

**3. Entry Categories:**

- 3.1. Single Operator.
- 3.2. Single Operator, QRP Portable.
- 3.3. Rover.
- 3.4. Multi Operator.
- 3.5. Limited Multi Operator.

**4. Exchange:** Grid-square locator (see April 1994 *QST*, p 86).

4.1. Exchange of signal report is optional.

**5. Scoring:**

5.1. QSO points:

- 5.1.1. Count one point for each complete 50- or 144-MHz QSO.
- 5.1.2. Count two points for each 222- or 432-MHz QSO.
- 5.1.3. Count four points for each 902- or 1296-MHz QSO.
- 5.1.4. Count eight points for each 2.3-GHz-or-higher QSO.

5.2. Multiplier: The total number of different grid squares worked per band. Each 2 degrees  $\times$  1 degree grid square counts as one multiplier on each band it is worked.

5.3. Final score: Multiply the total number of QSO points from all bands operated by the total number of multipliers for final score.

5.4. Rovers only: The final score consists of the total number of QSO points from all bands times the sum of unique multipliers (grid squares) worked per band (regardless of which grid square they were made in) plus one additional multiplier for every grid square activated (made a contact from).

5.4.1. Rovers are listed in the contest score listings under the Division from which the most QSOs were made.

**6. Miscellaneous:**

- 6.1. Stations may be worked for credit only once per band from

any given grid square, regardless of mode. This does not prohibit working a station from more than one grid square with the same call sign (such as a Rover).

6.2. Only one signal per band (6, 2, 1 1/4, etc) at any given time is permitted, regardless of mode.

6.3. Multi operator stations may not include QSOs with their own operators except on frequencies higher than 2.3 GHz. Even then, a complete, different station (transmitter, receiver and antenna) must exist for each QSO made under these conditions.

**7. Awards:** Certificates will be awarded in the following categories.

7.1. Single operator.

- 7.1.1. Top single operator in each ARRL/RAC Section.
- 7.1.2. Top single operator on each band (50, 144, 222, 432, 902, 1296 and 2304-and-up categories) in each ARRL/RAC Section where significant effort or competition is evident. (Note: Since the highest score per band will be the award winner for that band, an entrant may win a certificate with additional single-band endorsements.) For example, if WB0TEM has the highest single-operator all-band score in the Iowa Section and his 50- and 222-MHz scores are higher than any other Iowa single operator's, he will earn a certificate for being the single-operator Section leader and endorsements for 50 and 222 MHz.

7.2. Top single-operator, QRP portable in each ARRL/RAC Section where significant effort or competition is evident. (Single-operator, QRP portable entries are not eligible for single-band awards.)

7.3. Top rover in each ARRL Division and Canada where significant effort or competition is evident. (Rover entries are not eligible for single-band awards.)

7.4. Top multi operator score in each ARRL/RAC Section where significant effort or competition is evident. (Multi operator entries are not eligible for single-band awards.)

7.5. Top limited multi operator in each ARRL/RAC Section where significant effort or competition is evident. (Limited multi operator entries are not eligible for single-band awards.)

**8. Other:** See rules for All ARRL Contests and for VHF Contests.



# 1997 ARRL June VHF QSO Party Results

**N**ice weather and good propagation are a VHF contesteer's dream come true. During this year's June VHF QSO Party we at least had the good weather, and a few short band openings thrown in to boot. You would think that everyone would be tickled pink—not so. If the openings had lasted a little longer, folks would have been smiling, but judging by the

comments we received, participants were a little disappointed after last year's exceptional band openings. We, as contestants, want it all!

But we did enjoy some decent propagation. Six meters was pretty hot with some nice E-skip openings both days. When the band opened, some folks were working stations 2000 miles or so away. Doug, VE5UF, worked over 500 stations on 6 meters alone—that's almost as many as the multiop winner W2SZ's 674 6-meter QSOs.

Two meters and 70 cm experienced some delightful band enhancements as well. Several operators reported short openings with contacts out to 500 or 600 miles. Even so, it was the short-haul contacts that provided most QSOs.

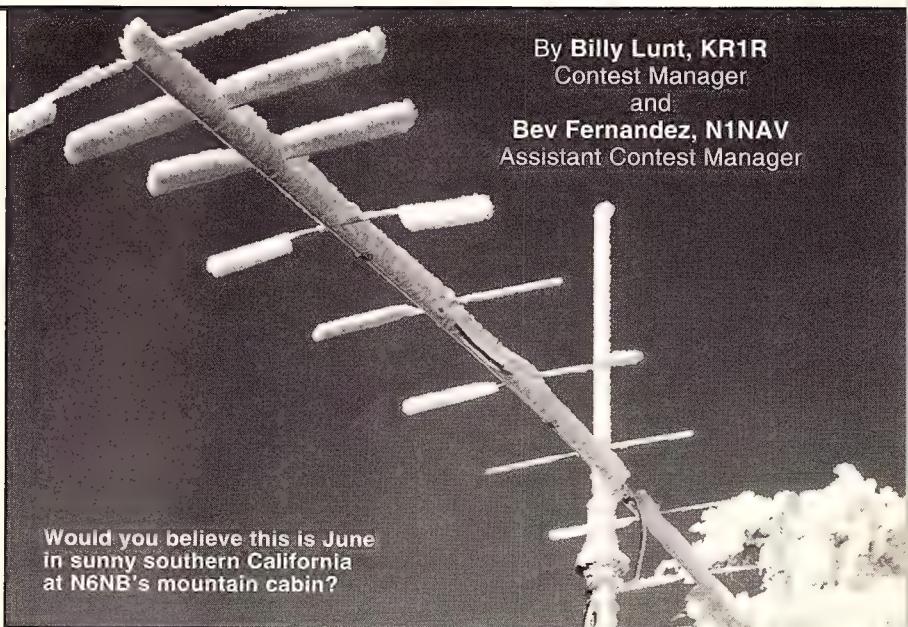
We had plenty of participation. There were 837 entries processed by the Contest Branch this year, and you can count on a few more that didn't send their logs to Headquarters. Always submit your entries, to show support for the contest, if nothing else.

Tom, WA8WZG, put in a tremendous effort again from his Ohio location. He surely took advantage of the many participants and used his microwave capability to secure a first-place single operator win. Tom also completed a few contacts using moonbounce, picking up at least seven additional multipliers. Great going, Tom! Connecticut's WA2TEO, wasn't far behind in second place with 350,000 points, and Southeast Region champ, Joel, WSZN, was third with 288,000.

Zack, W1VT, again took to the hills of southern Vermont trying to set a new QRP Portable score record. Zack didn't set the record he was after, but came away with the first-place QRP Portable plaque. Burt, W8TL/3, operating in the Maryland/DC section, was second with 58,000 points, and Bob, W2XL, from Eastern New York, was third with 33,000.

Perennial winners W2SZ/1 did it again! Operating from their favorite spot, Mt. Greylock, the highest peak in Massachusetts, they took the first-place multioperator plaque

By **Billy Lunt, KR1R**  
Contest Manager  
and  
**Bev Fernandez, N1NAV**  
Assistant Contest Manager



Would you believe this is June  
in sunny southern California  
at N6NB's mountain cabin?

scoring 1.1 million points. The crew at K3MQH gave it a good try finishing in second place with 936,000 points. Central Region leader, AA9D, was third with 790,000 points.

Operating in West Virginia, K8GP easily took top honors in the limited multioperator category scoring 547,000 points. W0UC, from Wisconsin, finished in second place with 245,000 points, and W8ULC, operating in



KE6GFI, doing just what you are supposed to do during the contest—having fun. She was operating from the ORG section using only a 5-W FM hand-held.



WV0H operating in South Dakota, or just hanging around? No, this is not what you're supposed to do with the antennas.

## Region Box

**Northeast Region**  
(New England, Hudson and Atlantic Divisions; Maritime and Quebec Sections)

WA2TEO 350,058 S  
K1RZ 243,698 S  
N2CEI 225,862 S  
W3OR 171,193 S  
KD1DU 135,564 S

**Southeast Region**  
(Delta, Roanoke and Southeastern Divisions)

W5ZN 288,320 S  
K2UOP/8 117,025 S  
N8UM 103,713 S  
N4KWX 58,295 S  
NS4W 41,114 S

**Central Region**  
(Central and Great Lakes Divisions; Ontario Section)

WA8WZG 395,031 S  
KE8FD 160,160 S  
K8TQK 107,100 S  
K2YAZ 101,752 S  
W9IIX 87,450 S

**Midwest Region**  
(Dakota, Midwest, Rocky Mountain and West Gulf Divisions; Manitoba and Saskatchewan Sections)

N5HHS 86,880 S  
VE5UF 65,274 S  
N0LL 64,255 S  
WQ0P 56,940 S  
WA0BWE 54,404 S

**West Coast Region**  
(Pacific, Northwestern and Southwestern Divisions; Alberta, British Columbia and NWT/Yukon Sections)

N6NB 65,331 S  
WB5OMF 37,674 S  
N6HFK 31,372 S  
KG6EG 30,780 S  
W7EW 30,081 S

W1VT 107,136 Q  
W8TL/3 58,788 Q  
W2XL 33,201 Q  
K1VZI 2,058 Q  
KB2ZNW 1,764 Q

KE4VCS 574 Q

N8XA 11,390 Q  
N9TZL 7,656 Q  
N8LGP 1,474 Q  
KA8NRC 756 Q  
WD9IAB 405 Q

W2SZ/1 1,164,030 M  
K3MQH 936,018 M  
W3CCX 721,413 M  
K3YTL 601,529 M  
K2TXB 319,784 M

W4IY 565,740 M

AA9D 790,641 M  
WW8M 150,400 M

K1TR 206,302 L  
N2HLT 175,216 L  
W1SJ 127,616 L  
W1QK 113,740 L  
AB2I 74,025 L

K8GP 547,143 L  
W4NH6 2,040 L  
N4ZWQ 23,474 L  
W4FBF 21,004 L  
KD4ZMR 17,250 L

W0UC 245,180 L  
W8ULC 216,726 L  
N9LAG 163,850 L  
KU8Y 156,604 L  
K8EB 102,834 L

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

AB4CR 214,000 R

N9MWB 92,452 R

K4EFD 90,830 R  
K4BIFC 64,375 R  
WB2QLP 44,323 R  
KC4ZRH 18,673 R

WBSNSR 75,285 R  
W9FR 20,825 R  
W9FX 20,825 R  
N9GH 14,091 R

W0ZQ 223,491 M

WABWZG 395,031 S  
WA2TEO 350,058 S  
W5ZN 288,320 S  
K1RZ 243,698 S  
N2CEI 225,862 S  
W3OR 171,193 S  
KD1DU 135,564 S  
K1RO 127,127 S  
K2UOP/8 117,025 S

W2OVS & K2RIW  
West Coast VHFer

W1XE 76,038 L  
W7XU 72,581 L  
N0AC 44,800 L  
VE4ZK 42,090 L

W2SZ/1, In Memory of Dick Goodman, WB1HH  
Wayne King, N2WK  
Northern Lights Radio Society & W0UC  
K5AM

W0UC 245,180 L  
W8ULC 216,726 L  
K1TR 206,302 L  
WB2ODH/6 201,790 L

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W0UC 245,180 L  
W8ULC 216,726 L  
K1TR 206,302 L  
WB2ODH/6 201,790 L

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R

W2FU 127,410 R  
W3EKT 70,720 R  
N11MD 60,588 R  
N3LJK 37,730 R  
KA2CKI 35,441 R</p

## QSO Leaders By Band

### Single Operator

50 MHz	144 MHz	222 MHz	432 MHz	902 MHz	1296 MHz
VE5UF	506	K3EW	390	WA8WZG	95
N5HHS	363	WA2TEO	366	WA2TEO	81
WA2TEO	295	KD1DU	322	K1RZ	75
N1MIA	274	WB2QQQ	312	N2CEI	72
WA2WQZ	266	K1RZ	269	KE8FD	69
K1RO	265	K1RO	265	KD1DU	67
K1RZ	257	KB2ZVP	262	K5MA	56
N2CEI	255	N2CEI	209	WB2DNE	56
K0GU	246	WA8WZG	209	K1RO	55
K5MA	241	KE8FD	208	K2UOP/8	55
WD4MGB	235	W5ZN	205	W3OR	55
WA0BWE	226	W3OR	202	KQ6DI	52
NN9K/0	214	N2MH	197	KC6ZWT	50
WA8WZG	212	K0MQS	189	VE3AX	49
VE3RM	208	K5MA	187	WD9EXD	49
			K8TQK	KG6EG	49
				N9WRO	84
					15
					K8TQK
					27

### Multioperator

50 MHz	144 MHz	222 MHz	432 MHz	902 MHz	1296 MHz
W2SZ/1	674	K3MQH	864	K3MQH	187
K8GP-L	653	K3YTL	585	WB2ODH/6-L	154
K3MQH	558	W2SZ/1	569	W2SZ/1	154
AA9D	555	W3CCX	520	W3CCX	136
W3CCX	537	W4IY	517	K3YTL	119
W0UC-L	526	K8GP-L	428	N9LAG-L	116
W4IY	519	AA9D	368	K8GP-L	109
KB1BWB	468	W1SJ-L	366	AA9D	107
K1TR-L	456	K3UZY-L	355	W4IY	98
K3YTL	426	N9LAG-L	343	N2YB	97
K2TBI	412	AB2I-L	339	W6AMT	92
N2WM	406	W1QK-L	337	K1TR-L	82
K2TBI	396	KB1BWB	321	N2HLT-L	80
W0ZQ	394	WB2ODH/6-L	309	W3SE-L	74
KU8Y-L	382	K2BAR	305	K2TVI	73
				KB1BWB	116
					K7VHF
					9
					K6PUD-L
					21
					W0ZQ
					21

### Multiplier Leaders By Band

#### Single Operator

50 MHz	144 MHz	222 MHz	432 MHz	902 MHz	1296 MHz
K0GU	132	KE8FD	63	KE8FD	40
VE5UF	129	K0MQS	59	WA8WZG	36
NN9K/0	128	K8TQK	59	K8TQK	32
N5HHS	120	WD9EXD	54	WD9EXD	31
N0LL	110	W9IIX	48	W5ZN	30
K5AM	104	WA2TEO	48	N2CEI	30
VE3RM	93	VE3AX	48	WA2TEO	28
WD4MGB	93	WA8WZG	48	VE3AX	28
WA2TEO	88	K2YAZ	46	K1RZ	26
NT2V	83	W5ZN	46	KD1DU	25
W8MM	81	N8UM	45	VA3ST	25
N8UM	78	N9AG	44	WB2DNE	25
KW9KW	78	KA9QFL	44	W3OR	25
W9RM	76	W8CM	42	K2YAZ	23
WD5K	76	K1RZ	42	K2UOP/8	23
WA2WQZ	76			AA8Q	27
				K2UOP/8	27
				K2YAZ	27
					12

50 MHz	144 MHz	222 MHz	432 MHz	902 MHz	1296 MHz
W0UC-L	170	K8GP-L	80	K3MQH	54
AA9D	163	K3MQH	73	K8GP-L	46
W7XU-L	150	W4IY	71	W4IY	43
K8GP-L	143	K2TBI	64	AA9D	40
W0ZQ	137	AA9D	63	W8ULC-L	37
W2SZ/1	131	K3YTL	62	N2YB	34
W5KFT-L	130	W8ULC-L	60	W3CCX	34
W1XE-L	122	W3CCX	56	W2SZ/1	33
K3MQH	121	K3UZY-L	55	K3YTL	31
K2TBI	120	N2YB	48	W8ODH/6-L	29
VE4ZK-L	113	W2SZ/1	48	N2HLT-L	29
W8ULC-L	110	WA6TBO-L	47	WW8M	33
W4IY	109	KT4JZ-L	47	WB8ERB-L	27
KU8Y-L	104	N7LQ	45	K2TBI	25
VE5NN	101	WB2ODH/6-L	44	WB8ERB-L	33
WV0H-L	101			KB18WB	33
N0AC-L	101			K7VHF	7
K1TR-L	101			KB15UA	6
				K2TBI	10
				K6WC-L	10
				AB2I-L	10

-L denotes Limited Multioperator

### Scores

Each line score lists call sign, score, stations worked, multipliers, number of grids activated (if Rover), entry category and bands (A= 50 MHz, B = 144 MHz, C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, G = 3456 MHz, H = 5760 MHz, I = 10 GHz, J = 24 GHz, K = 47 GHz, L = 75 GHz, M = 119 GHz, N = 142 GHz, O = 241 GHz, P = 300+ GHz). Call signs of division leaders and band indicators are listed in boldface type.

1

<b>Connecticut</b>	WA2TEO	350,058	987	246	S ABCD9EFG	W1QK (+N1ABY, KA1SYG, AA1MY, N1TMG, N1GS, W1QJQ, N1TVW)	K1RZ	13,740	785	121	L ABCD	WA1LXP	126	14	9	S A	W2SZ/1	23	AA9D	25
KD1DU	135,564	654	143	S ABCD9E	NE1A (+K1JN, KB1LN, N1HRA, KB1BEA, KA1VMG)	K1YJ	2,058	79	21	Q ABCD	K3YTL	59				K3YTL	20	K3YTL	24	
K1RO	127,127	693	143	S ABCD9E	NE1A (+K1JN, KB1LN, N1HRA, KB1BEA, KA1VMG)	N1JOY	3,338	26	13	Q A	W3CCX	20				K2TBI	24			
K1EM	44,523	379	97	S ABCDE	W1XX (+K1JX, WB1AV)	K1EKR (+N1A)	26,144	268	76	L ABCD	AA9D	45				W4IY	18	W4IY	22	
N1NQD	30,461	284	83	S ABCD	W1NRC (+N1CJB, KE1AV)	KO1V	10,432	163	64	S AB	W3CCX	18				W3CCX	21			
W1COT	25,160	226	74	S ABCDE	W1NRC (+N1CJB, KE1AV)	WA1JOF	10,432	163	64	S AB	W2SZ/1	16				W2SZ/1	21			
K1VW	7,516	171	42	S ABCD	W1NRC (+N1CJB, KE1AV)	N1DGF	6,480	115	40	S ABCD	W2SZ/1	16				WW8M	19			
K1WVX	4,590	94	45	S ABCD	W1NRC (+N1CJB, KE1AV)	W1REZ	1,232	56	22	S B	W3CCX	14				K3MQH	19			
N8WXQ	2,837	89	33	S ABCD	W1NRC (+N1CJB, KE1AV)	W1VWJ	1,976	76	26	L A	W1VWJ	76				N2YB	17			
K1TBI	2,277	555	23	S ABCD	W1NRC (+N1CJB, KE1AV)	W1QJL	57,348	571	108	S ABCD9EHI	W1VWJ	76				N2YB	17			
W1QJL	1,386	59	18	S ABCDE	W1NRC (+N1CJB, KE1AV)	W1QJL	23,919	75	67	S ABCDE	W1QJL	461	128	S	A BCD9E	W1QJL	20	K3YTL	24	
N1WPB	1,216	72	16	S ABCD	W1NRC (+N1CJB, KE1AV)	W1QJL	23,322	247	69	S ABCD9E	W1QJL	17,487	213	67	S ABCD	W1QJL	20	K3YTL	24	
N1BAH	1,206	87	18	S ABC	W1WV	14,080	190	64	S ABCD	W1QJL	14,770	173	70	S ABCD	W1QJL	20	K3YTL	24		
WB8IMY/7	774	43	18	S ABC	W1WV	8,400	142	56	S ABCD	W1QJL	6,960	111	40	S ABCD9E	W1QJL	20	K3YTL	24		
K8CH	656	41	18	S ABC	W1PM	1,974	68	18	S BD	W1QJL	2,592	76	27	S ABD	W1QJL	20	K3YTL	24		
N1SFE	480	48	8	S BD	N1PM	3,361	67	45	S ABD	W1QJL	2,475	75	33	S ABD	W1QJL	20	K3YTL	24		
W1AW (N1Q, op)	14	7	2	S B	N1EKV	1,746	68	18	S BD	W1QJL	1,555	32	13	S ABD	W1QJL	20	K3YTL	24		
N1WQI	385	35	13	S AB	N1VQR	1,584	66	22	S ABD	W1QJL	1,555	32	13	S ABD	W1QJL	20	K3YTL	24		
N1VOQ	196	25	7	Q ABD	N1VJX	1,456	58	26	S ABD	W1QJL	1,088	20	20	S ABD	W1QJL	20	K3YTL	24		
KB1BWB (AJ1X, KA1ZE, N1DPM, N1MUW, N1SAG, WZ1V, op)	252,938	997	203	M ABCD9EFG	AD1B	1,000	100	50	S ABD	W1QJL	206,302	957	178	L ABCD	W1QJL	20	K3YTL	24		
					N1RHS	918	49	17	S ABD	WB1FLD (+KA1FVY, N1MUW, N1RÜZ, N1EDM, AA1GU)	63,365	436	115	L ABCD	WB1FLD (+KA1FVY, N1MUW, N1RÜZ, N1EDM, AA1GU)	231	AA9D	25		
					K1HC	605	55	17	S B						N1FUS	10,019	191	48	S ABD	
					W1DYJ	442	34	13	S A						N1LYW	4,114	112	34	S ABD	
															WA1NYV	2,160	120	18	S B	

KD1XP	510	45	10	S	ABCD	N3TBB	2,240	80	28	S	AB	KD4LXB (+KD4VBI)	3,740	84	44	L	ABD	<b>Los Angeles</b>								
K1JG	270	18	15	S	A	N3TJL	1,079	71	13	S	ABD	KE6HPZ	23,920	339	52	S	ABCD									
KR1R	224	28	8	Q	A B	N3KRE	410	37	13	S	BD	AC6TA	10,728	231	38	S	ABD									
W2SZ1/ (A1AA1,W1VE,W1AZMS,N2BN1,N2YCA, WA2SP1,KD1PQ,W1XSY,K2AD,N2GXH,N2VZO, WS2B,K1EP,K1DZV,K2TR,N2PA,W2ARQ, KE4BF,W1SZ,K1A1PRT,K2ETP,N2XRE,W2AAU, WA8USA,ops)	1,164,030	2045	345	M	ABCD9EFGHJK	N3OQD	390	26	13	S	BD	KE6FCT	10,535	174	49	S	ABCD									
K1AE	20,448	288	71	L	AB	W3GAWA	80	16	5	S	ABCD	W6IST	10,168	173	41	S	ABCD									
N1RWM	9,292	202	46	L	AB	K3AN	192	32	6	Q	A	KE6MM	6,127	177	35	S	AB									
2						N3AW3UL	85	17	5	Q	A	KE6MAS	5,938	168	26	S	ABCD									
<b>Eastern New York</b>																										
K2ZZ	30,646	324	77	S	ABCD	K3MQH	(A13M,K3JFL,K3MM,K3RA,N3EYB, N3KKM,N3KTV,W2E03,W3GHR,WF3T,ops)	K3YTL	(W1A1W,K1DZV,K2AD,K4E50,K4ZHT,K93QI, K930A,K3MKZ,K93W,N0PBH,N3RN,N0TDE, N3TKK,V1A3N3V1,N3ZPE,W3DZH,W43JWP, WA3WNS,W3BKO,ops)	N8UM	103,713	454	181	S	ABCD9E	KE6AJX	4,640	194	26	S	BCD					
WB2DUS	20,915	169	89	S	ABCD	W3CCX	(A3AGN,W3A3NUF,W3K3M,W3A3XV,W2SJ, W2SK,W3A3RLT,W1A1YH0,K3MF1,W2T3,N3EXA, N3NGE,N3EVV,W3UC,N3ITT,N3ZO,W3JYO, W3GAD,W3YUE,ops)	NS4W	41,114	208	122	S	BD	KE6JLF	2,620	103	20	S	BC							
W2WVOZ	20,216	268	76	S	AB	N3ADC	(+KA2RKR,K1A0R)	KE4JLE	9,348	157	57	S	ABD	KE6MAK	1,778	99	14	S	ABD							
W2W1N	19,034	202	65	S	ABCD	K3UZY	(+W2K3V)	KE4WUT	7,105	145	49	S	A	AC6EN	1,734	90	17	S	ABD							
N2MSS	16,532	249	44	S	ABCD	KD4HMK	7,093	149	41	S	ABD	KE6FVN	1,504	60	16	S	ABCD									
K3EW	12,090	390	31	S	B	W4BF	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	AD4F	3,922	92	37	S	ABD	KE6FJG	1,414	85	14	S	ABD							
N2YQW	10,692	167	54	S	ABD	W3CZ	21,004	207	89	L	ABCD	KD6OZ	938	49	14	S	BDE									
N2TMT	6,424	146	44	S	A	NT4L	(KQ4TV,K1B4DC,ops)	N4LGY	2,310	66	30	S	BD	W6EZB	595	85	7	S	B							
W2CCP	5,168	136	38	S	B	N4USG	1,271	38	31	S	ABD	KE6EJU	2,592	32	6	S	BD									
N2NCQ	3,289	107	23	S	ABCD	N4QJO	324	20	12	S	ABD	W6FC	1,601	36	8	S	BD									
W2JHJ	2,014	80	19	S	ABCD	W4BG	1,35	14	9	S	ABD	KE6JN	160	14	8	S	BD									
WA2BAH	1,162	72	14	S	ABCD	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	K4PAF	(+KE4N0L,KF4NUX)	952	62	14	L	ABD	N6IO	12,430	170	55	S	ABDE						
W2RJS	688	43	16	S	BD	N3IR	(K3IR,N3PTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	9,092	263	46	L	ABDE	KD6RMS	4,092	128	22	S	ABCD						
K2AMU	468	32	12	S	ABCD	W3CZ	21,004	207	89	L	ABCD	WB2D0H/ (+K6KWO,N6RMJ,N6ZE,W6YLZ, W6ADJS)	201,790	884	170	L	ABCD									
N2ZCQ	482	65	56	S	ABCD	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD					
K2BTPD	396	38	9	S	BD	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	WA9STI/6	(+W4FGFW)	16,376	263	46	L	ABDE	WA9STI/6	(+W4FGFW)	16,376	263	46	L	ABDE					
K2CBRY	255	51	56	S	BD	N3IR	(K3IR,N3PTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	201,790	884	170	L	ABCD												
N2WJG	150	30	55	S	B	W3CZ	21,004	207	89	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD								
W2FWK	1,1	1	1	S	B	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	201,790	884	170	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD					
W2XL	33,201	265	93	S	ABCD9E	W3CZ	21,004	207	89	L	ABCD	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	201,790	884	170	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD	
K2D2X	1,695	81	15	Q	B	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	201,790	884	170	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD					
K2T7V/ (WB2VVS,VE3I9Y,N2D2V,N2H2T,N2N2WZ, N2D2H,N2FCM,N2GK6M,WB2NHQ,K2ZV1,N3EMF, N2G2D,ops)	175,338	884	153	M	ABCD9EFH	W3CZ	21,004	207	89	L	ABCD	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	201,790	884	170	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD	
W1SJ (+N2Y1W,W2AII,W2AXW,WN2YK,W2SSS, WB2ZP,WC2L,N2SPF,KC2G4L)	127,916	821	126	L	ABCD	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	201,790	884	170	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD					
AB2I (+AB2J,W2AII,W2AXW,WN2YK,W2SSS, WB2ZP,WC2L,N2SPF,KC2G4L)	74,025	618	105	L	ABDE	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	201,790	884	170	L	ABCD	W3E3	(+N8P0Q,KQ6BS)	76,167	629	93	L	ABCD					
<b>NYC-Long Island</b>																		<b>Orange</b>								
N2GHR	31,837	232	79	S	ABD9E	N3QJ	33,152	220	112	S	ABDE	N6HKF	31,372	258	92	S	ABCD									
NB2T	8,060	205	26	S	BCD	N3FY	27,075	212	93	S	ABCD	KG6EG	30,192	281	76	S	ABCD									
NY2U5	4,620	119	30	S	BD	N3XEG	11,937	173	63	S	ABCD	KC6WWL	14,100	155	50	S	BCDE									
WA2ZFH	3,810	79	30	S	ABCD	KA3SDP	10,208	134	55	S	ABD	N6DN	9,400	152	50	S	ABCD									
N2QHS	2,448	81	24	S	ABCD	A3GGM	5,734	91	47	S	ABCD	KG6F	9,184	166	41	S	BD									
NT2T	1,001	81	10	S	BD	W3P	16,920	614	180	M	ABCD9E	KG6IB	7,998	116	43	S	ABCD									
N2ZRC	1,000	81	10	S	BD	W8T3/	58,788	279	142	S	ABCD9E	KG6JY	3,570	103	30	S	AB									
KF2XF	495	45	11	S	B	W3CZ	16,920	614	180	M	ABCD9E	KG6WU	2,604	93	28	S	AB									
WB2AMU	988	52	19	S	A	AD3L	(K3EVQ,K3NPTT,N3TJJ,N3UED,N2DYK,N3TUQ, K3B3G5,KC3L6,ops)	W4BFB	(WB2NHQ,KD4GCF,KM4KQ,KF4NLR, KF4NJJ,ops)	9,092	263	46	L	ABDE	KG6XO	1,00	20	5	S	A						
<b>Northern New Jersey</b>																		<b>Santa Barbara</b>								
N2CEI	225,862	700	221	S	ABCD9EFGHJ	N3QJ	33,152	220	112	S	ABDE	N6PI	24,219	263	69	S	ABCD									
WB2WIIH	34,114	346	74	S	ABCD	N3FY	27,075	212	93	S	ABCD	KE6RCI	984	82	12	S	B									
WB2VV	23,458	199	74	S	ABCD9EF	N3XEG	11,937	173	63	S	ABCD	WB6AAG	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
NM7	13,428	285	36	S	ABCD	KA3SDP	10,208	134	55	S	ABD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
K2B2K	1,200	163	57	S	ABCD	A3GGM	5,734	91	47	S	ABCD	W6PZJ	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
WB2QOQ	9,672	312	31	S	B	W3P	16,920	614	180	M	ABCD9E	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
WB2CUT	4,550	182	26	S	AB	W8T3/	58,788	279	142	S	ABCD9E	W6PZJ	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
N2LMU	3,610	151	19	S	ABD	W3CZ	16,920	614	180	M	ABCD9E	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
WA2BKN	2,784	92	29	S	ABD	AD4HG	11,725	147	67	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
WA2ASQ	533	41	13	S	A	W4BZG	3,400	62	38	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
WB2MMB	508	46	11	S	BD	AD4F	1,274	105	44	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
K2B2JG	385	53	7	S	BD	W4BZG	3,400	62	38	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
K2JEF	370	37	10	S	AB	AD4F	1,274	105	44	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
K2E3P	312	25	12	S	A	W4BZG	3,400	62	38	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
K2V2F	304	38	8	S	B	AD4F	1,274	105	44	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
KB2ZMM	300	30	3	S	B	W4BZG	3,400	62	38	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
K2C2AWX	309	10	3	S	B	AD4F	1,274	105	44	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
N2WMM (+K2B2M,K2B2JG,K2A2EV,KB2LHH,N2HEB, N2HMM,N2T2T)	192,010	854	182	M	ABCD9EFH	AD4F	1,274	105	44	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
K2B2V	45,045	414	105	S	ABD	W4BZG	3,400	62	38	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
WA2AEY	13,575	225	87	S	AB	AD4F	1,274	105	44	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								
NT2W	640	32	20	S	AB	W4BZG	3,400	62	38	S	ABCD	W61M	(-W61M,WB6PZJ)	20,532	310	89	L	ABCD								

WA7JTM	12,474	145	77	S	ABD	WA8NRC	756	35	_21	Q	ABD	N0JIK	5,978	96	61	S	ABD	Indonesia									
KF7JS	1,188	40	22	S	ABD	W8ULC (-K+WB8W, W8LR, W8AAH)	216,726	723	246	L	ABCD	N0LIE	4,872	103	42	S	BC	YC2OK	14,040	187	52	S	ABDE				
WB7OHF	1,062	54	18	S	ABD	KIBCA (N8MWK, N8UVM, KC8FXL, KC8FJH)	1,512	55	27	S	AB	W0RT	2,808	65	36	S	ABD	Brazil	PY2CDS	282	38	6	S	ABD			
WB7QIC	722	38	19	S	B	KC8HKL, KB8PYU, KB8YXB, KB8YXC, WD8LWC	2,908	132	22	S	AB	KB0PGJ	1,512	55	27	S	AB										
N6MA	684	38	18	S	ABD	KABLGK, KB8R, KB8OB, KB8BUD, ops)	20,924	191	96	L	ABDE	W0QXN	252	28	7	Q	BD	N0YQR (+K0FPC, KA0KCI, N0MQQ, KB0JJKR, WA8ZNC)	24,198	172	111	M	ABDE				
N7TX	252	36	7	S	A	KC8HLK (+K8WW)	3,237	83	39	L	AB	KC0AHN (KB0YHU, KC0BFA, KB0YHT, KB0YWM,	24,198	172	111	M	ABDE										
KF7NP (+NU8U)	15,906	162	86	L	ABCD	KB0PH, N5CLU, ops)	2,908	132	22	S	AB	KB0PH	1,512	55	27	S	AB	KA0KAN (+KB0YF, KB0VER)	10,974	139	58	L	ABDE				
KE7FC (+KC8JC, N7GJD)	13,246	162	74	L	ABD	W0Y0C (+KB0PHS)	1,972	57	34	L	AB	W0Y0C (+KB0PHS)	12	4	3	L	AB	W2FU	127,410	547	137	R	5	ABCD9EFGH			
N7SQN (+KC7KMU)	7,920	136	48	L	ABDE							KA0KAN (+KB0YF, KB0VER)	10,974	139	58	L	ABDE	W3EKT	70,720	610	80	R	4	ABCD9E			
<b>Eastern Washington</b>												KA0KAN (+KB0YF, KB0VER)	10,974	139	58	L	ABDE	NSLJK	37,730	250	98	R	4	ABCD9E			
N7AU	16,016	158	77	S	ABCDE							KA2CKI (+K2VX)	35,441	279	83	R	6	ABCD9E	KA3ZMW (+N3QFZ)	27,336	326	67	R	7	ABCD		
AB7IZ	8,442	116	67	S	ABD							N3R9W	5,920	159	32	R	5	ABD	N3R9W	5,920	159	32	R	5	ABD		
N7YAP	6,032	91	58	S	ABD																						
N3CEV	4,515	77	43	S	ABD9EGI																						
W7PCE	1,798	58	31	S	AB																						
K7XW (+W7FH)	45,875	273	125	M	ABCD9EP																						
<b>K7CW (+K7KX)</b>	29,988	223	119	L	ABDE																						
K7TJ (K7JR, N7S7, ops)	4,185	75	45	L	ABD																						
<b>Idaho</b>																											
KD7IV	8,320	98	84	S	ABD9E																						
KA7GUX	6,166	94	80	S	ABD																						
W7ID	4,158	65	42	S	ABDE																						
KC7IJ	3,332	68	49	S	AB																						
WA6KLK (+WD6HDK, GLD6LBT)	29,614	189	134	M	ABCDE																						
WA0DYU (+K7MLM)	9,849	120	67	L	ABC																						
N7LT (+K7HCR)	9,100	132	65	L	ABD																						
KJ7TH (+K7AT)	5,280	107	40	L	ABD																						
<b>Montana</b>																											
WA7PDC	3,225	71	43	S	ABD																						
W7TCK (KAT7YAO, KB7SYO, KC7C7Z, ops)	589	29	19	L	ABD																						
<b>Nevada</b>																											
K7ICW	17,484	148	94	S	ABCDE																						
NW7O	6,710	92	51	S	ABCD																						
N7LQ (+KB7KJ, KF7FH, N7V0D, ROGER, TR4VIS, WA6GMN)	50,274	311	133	M	ABDE																						
<b>Oregon</b>																											
W7EW	30,081	241	111	S	ABCDE																						
N7EJU	16,686	198	81	S	ABD																						
N7DB	14,400	168	80	S	ABCD																						
N7YAG	9,870	161	47	S	ABCD9E																						
KA7MFM	3,075	63	41	S	ABD																						
W7PDC	2,358	52	31	S	BDEFI																						
K7HSJ	2,022	58	23	S	ABCD																						
KI7WB	1,104	48	23	S	AB																						
K6ZX	432	27	16	S	AB																						
WB7TSO	96	16	6	S	SSB																						
KG7FU	84	11	7	S	ABD																						
W7IY (+WB6FFC)	29,046	235	103	L	ABDE																						
<b>Utah</b>																											
KA9LNP	5,082	100	42	S	ABCD																						
N7JTA	3,074	80	29	S	ABDE																						
WA7HQQ	1,312	41	31	S	AB																						
KC7KZD	243	23	9	S	ABD																						
WA0YPL	30	6	5	S	AB																						
<b>Western Washington</b>																											
W7FJ	11,174	151	74	S	AB																						
KW7R	3,120	92	26	S	ABDE																						
K7ESW	3,018	76	26	S	ABCD9EF																						
KH6JJK	1,100	59	20	S	ABCD																						
K7VHF (K7ND, K7DT5, K7CA7K, N7W7, ops)	90,156	468	132	M	ABCD9EFGI																						
N7EPD (+WL7E)	29,094	324	78	L	ABD																						
W7DQ (N3EG, KJ7OX, KB7ADQ, N7UD, ops)	1,220	53	20	L	ABD																						
<b>Wyoming</b>																											
KI7W	4,173	107	39	S	ABD																						
WA7KYM	1,278	39	18	S	BCDE																						
<b>8</b>																											
<b>Michigan</b>																											
K2YAZ	101,752	385	184	S	ABCD9EF																						
K8MD	69,080	329	157	S	ABCD9E																						
W2BT	48,384	286	128	S	ABCD9E																						
N8CGY	13,120	138	82	S	ABCD																						
K8RS	11,440	156	55	S	ABCD9E																						
K8NFT	4,687	95	43	S	ABD																						
K8BLU	4,488	102	44	S	ABD																						
K8SYR	4,148	116	79	S	ABD																						
WD9KUF	4,027	72	59	S	ABD																						
K8BMB	3,692	71	42	S	AB																						
K8PT	3,276	78	42	S	AB																						
N8ZVB	2,205	63	33	S	AB																						
N8YAM	1,248	52	24	S	AB																						
KGBZF	720	29	20	S	BD																						
WW8WM (KC8DAZ, NE8Q, N8XQF, ops)	150,400	438	188																								

# 1997 ARRL August UHF Contest Results

By **Billy Lunt, KR1R**  
Contest Manager  
and  
**Bev Fernandez, N1NAV**  
Assistant Contest Manager

**A**ugust is a prime time for vacations, picnics, running along the beach, sunbathing, and other enjoyable pursuits. Falling right smack in the middle of all of these leisure activities, you'll find the August UHF Contest—always the first full weekend in August. In most corners of the world, you'll find folks resting and relaxing—but not UHF fanatics. They spend their weekends heading to their favorite mountaintop or sitting in a hot radio shack breathing stale air. Their blood really gets pumping when a band opening occurs. In fact, there is nothing more exciting than a contest band opening. Everyone goes crazy—people you never heard before are calling you, new multipliers are rolling in at a rapid rate, and you can hardly keep up with the logging!

During the UHF Contest, we did have some pretty good band openings. Even though some folks didn't notice them, they were there. The best place to be was on 432 MHz. When the band opened, people were making contacts with stations 400 miles or so away. Don't overlook 222 MHz. That's another band that can really pay off in the UHF Contest.

Participation in the UHF Contest has been holding pretty steady over the last few years. This is largely thanks to the participation pin program. We awarded 100 participation pins in the 1997 contest. But pins can't do it alone. If you participate in the

UHF Contest be sure to send your entry to Headquarters to show your support. The total number of entries in this year's contest was down only slightly from last year's total. That's not bad for the UHF Contest. Also, while looking through the entries, we noticed a very interesting and encouraging item—activity on the higher bands is increasing. More people are getting equipment and trying out the microwave bands. Thirty seven stations (26 single operators, 7 rovers, and 4 multioperators) sent in entries for 2304 MHz and higher: 2304 MHz, 37; 3456 MHz, 22; 5760 MHz, 16; 10 GHz, 19; 24 GHz, 5; and 300+ GHz, 1.

This was a "first contest" for many of the participants and most first-timers weren't concentrating on amassing huge point totals; they just wanted to have fun. "I'll be back next year" was a very common quote.

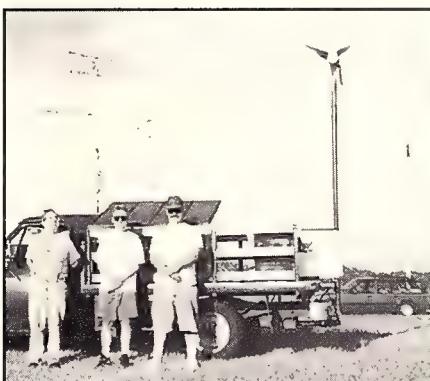
Yes, the band openings could have been longer, but we still had some impressive scores. The single operator and rover categories had overall record-breaking scores. New division records were set in 15 divisions (4 single operators, and 11 rovers). The winner in the single operator category, Tom, WA8WZG, set the overall score record at 237,930. Great going Tom! In the rover category, we also had some record breaking scores. Jim, WB9SNR, set a new overall rover record with a score of 112,407 points, 40 thousand more than last year. The crew at W2SZ/1 easily won the multioperator category from their Mt. Greylock location, scoring 382,752 points. There were some impressive scores in all the categories. Check out the score boxes.

You don't have to have a winning score to submit an entry. Get out there, get on the air, and have a great time. The UHF Contest is an ideal opportunity to get the family together and go camping, or hiking, or whatever. (Just don't tell your spouse you brought your radio along!) It's also a good opportunity to get the kids interested in ham radio. Even if you only make a few contacts, send in your entry. If you don't want to turn in a score, we can use it as a check log.

Find yourself a good location, and make a special effort to get on a "new" band. We need to populate the microwave bands. See you next summer—August 1-2, 1998—for the next ARRL UHF Contest.

## Top Five

Single Operator	Multioperator	Rover
WA8WZG 237,930	W2SZ/1 382,752	WB9SNR 112,407
WW8M 132,549	N2ODK 74,670	K9PW 102,480
K3SIW/9 132,006	WA3UGP 25,200	VE3SMA 49,140
WA2FGK 108,225 (K2LNS,op)	NUTZ 15,621	K9JK 26,268
AA2UK 106,215	AA4ZZ 12,300	VE3OIL 17,820



Joe, N8HNS, with his team at Fisk Knob Park in Kent County, Michigan. Their solar-powered vehicle is ready to go! They worked 16 grids for a total score of 9120.



Stephanie, KC8ALA, at her portable location overlooking Lake Michigan, found it very hard to keep her mind on the contest. Who wouldn't be distracted with a view like that?



Larry, KB8JUI, has a comfortable seat and is hard at work making contacts. He finished second place in the Roanoke division.

## Scores

Each line score lists call sign, score, stations worked, multipliers, and band (C = 222 MHz, D = 432 MHz, 9 = 902 MHz, E = 1296 MHz, F = 2304 MHz, I = 10 GHz, J = 24 GHz, K = 47 GHz, L = 75 GHz, M = 119 GHz, N = 142 GHz, O = 241 GHz, P = 300+ GHz), hours, and ARRL/RAC Section. Call signs of division leaders and band indicators are listed in boldface type.

# Index to Volume 81—1997

## AMATEUR RADIO WORLD—Column

CITEL Reinvents Itself: Jun, 93  
JARL Celebrates 70th Anniversary: Feb, 91  
Radio Club Argentino Celebrates 75th: Apr, 85  
Region 3 Conference Bridges the Pacific: Dec, 91  
Region 3 Society Prepare for Beijing Conference: Aug, 87  
State Department Applies for US CEPT Participation: Dec, 91  
Worldwide Amateur Growth Slows (Sumner): Oct, 104

## AMATEUR SATELLITES—Column (Ford)

1997 AMSAT-NA Space Symposium: Dec, 93  
Box for Phase 3D, A (Coggins): Jun, 94  
"It Is Ballooooon!" (SimSat): Apr, 86  
OSCAR 13: Sic Transit Gloria Mundi: Feb, 94  
Satellite Update: Aug, 89  
UNAMSAT and AMSAT-MEXICO (Jimenez): Oct, 96

## CONTESTS AND OPERATING ACTIVITIES

### Contest Announcements/Rules

1998 ARRL International DX Contest Rules: Dec, 102  
1998 ARRL RTTY Roundup Rules: Dec, 101  
1998 ARRL January VHF Sweepstakes Rules: Dec, 104  
Armed Forces Day 1997: May, 110  
Eleventh Annual School Club Roundup, The (Malchick): Jan, 114  
General Rules for All ARRL Contests (Hutchinson): Dec, 100  
Rules, 1997 ARRL 10 GHz and up Cumulative Contest: Jun, 104  
Rules, 1997 ARRL 10-Meter Contest: Nov, 108  
Rules, 1997 ARRL 160-Meter Contest: Nov, 107  
Rules, 1997 ARRL International EME Competition: Sep, 120  
Rules, 1997 ARRL November Sweepstakes: Oct, 116  
Rules, 1997 ARRL September VHF QSO Party: Aug, 101  
Rules, 1997 ARRL UHF Contest: Jul, 104  
Rules, 1997 Field Day: May, 109  
Rules, 1997 IARU HF World Championship: Apr, 100  
Rules, 1997 June VHF QSO Party: May, 111  
Straight Key Night Rules: Dec, 100

### Contest Results

1997 ARRL August UHF Contest Results (Lunt, Fernandez): Dec, 110  
1997 ARRL June VHF QSO Party Results (Lunt, Fernandez): Dec, 105  
1997 School Club Roundup, The (Malchick): Sep, 118  
CW Results, 1996 ARRL November Sweepstakes (Lunt, Thompson): May, 99  
CW Results, 1997 ARRL International DX Contest (Lunt, Patton): Sep, 108  
Field Day 1997 (Fernandez, Lunt): Nov, 96  
Phone Results, 1996 ARRL November Sweepstakes (Lunt, Thompson): Jun, 111  
Phone Results, 1997 ARRL International DX Contest (Lunt, Patton): Oct, 109  
Results, 1996 ARRL 10 GHz and Up Cumulative Contest (Gordienko, Lunt): Mar, 99  
Results, 1996 ARRL 10-Meter Contest (Lunt): Jul, 99  
Results, 1996 ARRL 160-Meter Contest (Lunt): Apr, 102  
Results, 1996 ARRL International EME Competition (Lunt): May, 106  
Results, 1996 ARRL September VHF QSO Party (Gordienko, Lunt): Jan, 109

Results, 1997 ARRL January VHF Sweepstakes (Lunt): Jun, 105

Results, 1997 ARRL RTTY Roundup (Lunt, Nesta): Aug, 97  
Results, 1996 IARU HF World Championship (Gordienko, Lunt): Feb, 105  
Straight Key Night 1996 (Brogdon): Apr, 101  
Third Annual Collegiate Championship (sidebar to 1996 ARRL November Sweepstakes Phone Results) (Barron): Jun, 113

## Contesting/Operating

Alaskan Nightmare, An (sidebar to 1997 ARRL RTTY Roundup Results) (Ward): Aug, 98  
Average Op's Guide to Contesting Fun, An (Kleinschmidt): Oct, 57

Billy Lunt, KR1R, Goes Roving (sidebar to The 1996 ARRL September VHF QSO Party Results) (Brogdon): Jan, 110  
"Considerate Operator's Frequency Guide", The: Jan, 106  
How I Worked Five Grids on Sixteen Bands (sidebar to 1997 ARRL January VHF Sweepstakes Results) (Kitchens): Jun, 106  
Jamboree on the Air—JOTA'97 (Swanson): Oct, 68

Liberty Radio Explorers and SCR, The (sidebar to The 1997 School Club Roundup) (Malchick): Sep, 119  
Niagara Falls Adventure (sidebar to The 1996 ARRL 10 GHz and Up Cumulative Contest Results) (Tuplis): Mar, 100  
Propagation Charts (Hall): Jan, 88; Feb, 85; Mar, 83; Apr, 79; May, 82; Jun, 84; Jul, 76; Aug, 78; Sep, 85; Oct, 90; Nov, 79

## CORRESPONDENCE

A-1 Operator at Last (Hunsaker): May, 25  
Alternative CQs (Stewart): May, 24  
Another Digital Refugee (Balch): Oct, 24  
Another Ham Lost (Wallis): Mar, 25  
Arecibo and SETI (Shuch): Aug, 24  
Best Filter, The (Hanlon): Mar, 24  
Breaking in New Coax (Day, Faulkner): Jun, 24  
Catching Those 6-Meter Openings (Weathers): Jul, 25  
CB: Pro and Con (Bueneman, Friedman): Mar, 24  
Changing URLs (Duncan): Aug, 25  
Closed Repeater Debate Continues (Rideout, Wheeler): Feb, 25  
Contest QSLs (Massicotte): May, 25  
CQ Cellular? (Parker): Oct, 25  
Crossband Links to 5.252 MHz (Makky, Sr): Sep, 25  
Crystal Magic (Ohlmacher): Nov, 25  
CW Compromise?, A (Sohl): Jul, 25  
Dilbert Cartoon is Sarcastic (Ringer): Nov, 24  
Donate! (Bates) Dec, 25  
Don't Ignore Speech-Synthesized CQs (Finger): Feb, 24  
Early Closings (Riley): May, 25  
Ed Tilton Remembered (Smith): Oct, 24  
Educate Your Neighbors (Westphal): May, 24  
FCC Warning is a Joke (Harness): Jan, 24  
Fear of the Mod? (Johnston): Mar, 25  
Fly Safe (Volner): Oct, 24  
Forgotten Class, The (Strouse): Nov, 25  
Give the Old Ships a Voice (Basye): Jul, 25  
Good Scrounging, Sergeant! (Alliston): Sep, 25  
Grampa Did Get a Better Deal (Lytle): Apr, 24

Ham Activity in Decline (Leggett): Jun, 24  
Happy Ending, A (Wallis): Dec, 25  
Heard Island Kudos (Jones): Apr, 25  
High Cost of Jamming, The (Powell): Apr, 25  
If You're Having Fun, Stop It! (Jones): Jul, 24  
Ignoring the Band Plan (Stahlman): Jan, 25  
JOTA in the Nation's Capital (Skutt): Jan, 24  
Kudos to teens! (Barthel): Dec, 24  
Let's Do Lunch (Carter): Aug, 25  
License Restructuring (Miller): Oct, 25  
Man With a Plan, A (Johnson): Jul, 24  
Maunder Minimum, The (MacKeand): Sep, 25

More Beginner Satellites (Flanagan): Oct, 24  
More CTCSS Advantages (Brothers): Mar, 24

More Morse at the Movies (Leonard, Vician): Aug, 25

More Simplex Intrusions (Fill): Apr, 24

More Unanswered Calls (Katz): Feb, 24

Morse Exemptions (Anzivino): Dec, 24

New Use for QST, A (Lindley): Nov, 25

Not "A Vision of Our Future" (Bates): Dec, 24

Off Line—and Loving It (Linscott): Jul, 24

Old Gents' Net (DeLuca): Oct, 24

One Good Turn... (Cotterman): Nov, 25

Oppose Racism (Huenemann): May, 25

Packet/Internet Gateways (Popecki): Oct, 25

Phonetically Speaking—A European

Reflection (Lander): Jul, 24

Phooey! (Caughey): Nov, 24

Political Hamming (Makuch): Aug, 24

QSLs: The Other Side of the Story (Luther): Sep, 24

QST Satisfies the Itch (McLaughlin): Jul, 25

Radio Racism (Brizill): Feb, 24

Reaching the Young and Old (Krane): Aug, 24

Reactions to CW Testing Compromise (Rich, Steele): Sep, 24

Recapturing the Magic (Smith): Jan, 25

Restricting Your Right to Receive (Craswell): Nov, 24

Revisiting Heard Island (Helm, Moran): Jun, 24

Saying "No" to Internet Phone (Crompton): Feb, 25

Saying "Yes" to Internet Phone (Bilow, Millner): Apr, 24

Selling Ham Radio (Wexelbaum): Aug, 24

Slow Down (Amen): Nov, 25

Sour Grapes? (Kelly): May, 24

Successful Failure, A (Buffington): Aug, 24

Teens Speak! (Johnson, Sanderman): Sep, 24

Thanks, Doc (Needham): Mar, 25

Thanks, Texas Utilities (Gary): Jun, 25

Too Much Doom and Gloom? (Gilcrest): Jun, 24

Try 6-Meter AM! (Booth): Oct, 25

Twelve Things You Can Do (Rosenfeld): Dec, 25

Update Your Address (Hughes): Jun, 25

Vanity Grumblings (Scheinberg): Feb, 24

Virtue of Compromise, The (Hargenrader): Jan, 24

Vision of Our Future, A (Previty): Oct, 24

Wake Up, Indeed (Evans, Watrous): Apr, 24

Wake-Up Call, A (Sniffen): Jan, 24

Why QRP? (McLaughlin): Mar, 24

Why QRP? A Response (Evans): May, 24

## DC CURRENTS—Column (Mansfield)

105th Congress—Let the Games Begin!: Jan, 15

1997 Session Ends with Whimpers and Bangs in Washington: Dec, 15

Amateur Radio Awareness in Pennsylvania: Aug, 16

Amateur Radio Gets TV, Radio News Coverage: Dec, 16

ARRL and the Political Process: Mar, 16

ARRL Meets With Markey's Staff on HR 1964: Sep, 15

ARRL Scores PR Hits: Sep, 16

ARRL Scores Public Relations Hit: Jan, 16

ARRL's Game Plan Includes Meetings with Tauzin's Staff: Oct, 15

Balancing the Budget, the Spectrum, the Future: Aug, 15

Budget Deal Contains Spectrum Money...or Does It?: Jul, 16

Can Amateurs Get Primary Status on 2300-2305 MHz?: Jan, 16

Congress Acts to Protect Volunteers: Jul, 15

Congress Aims Cellular Privacy Issue: Apr, 16

Congress May Take Another Look at Spectrum Auctions: Jun, 16

Congress Rolling—Telecom Agenda Still Murky: Mar, 15

Don't Send In The Clones: Nov, 16

Early Telecommunications Agenda Likely to Focus on Political Reform: Feb, 15

Experimental Radio Service Regulations  
Revised: Mar, 16  
FCC Chairman Hundt Talks to Congress about Public Safety Needs: Jun, 16  
FCC Chairman Outlines Commission Agenda for 1997: Feb, 16  
FCC Private Wireless Chief Leaves for Greener Pastures: Feb, 15  
FCC Unveils National Information Infrastructure Plans: Mar, 15  
FCC Wireless Chief Hails Market-Based Spectrum Policies: Nov, 16  
Follow-up on Spectrum Auction and the Budget: Oct, 16  
H.R. 2369, July 31, 1997: Oct, 16  
Hearings, Senate Bills, Attempt to Control Spectrum Auctions: Jul, 15  
House Bill Riles Scanner Buffs: Sep, 15  
Hurry Up and Wait Is the Mode of FCC Matters: Jan, 15  
Is There Life After Adjournment?: Jan, 16  
Key Committees Shaping Up With Few Changes for 105th Congress: Feb, 15  
Majority Leader Lott Lauds Pressler: Mar, 16  
Musical Chairs, or Deck Chairs on the Titanic: Aug, 16  
New Amateur Spectrum Bill May Be On The Horizon: Nov, 16  
New Anti-Eavesdropping Bill Shocks Scanner Fans: Oct, 15  
New FCC Commissioners Headed for Senate Confirmation: Dec, 16  
New Feingold Bill Likely to Reflect Amateur Concerns: Mar, 16  
New Jersey Amateurs Get the Message Out: May, 16  
Plot Thickens on Liability Reform, The: Jun, 15  
Q/As on the Liability Issue: Aug, 15  
Recent ARRL Filings Stake Out Spectrum Claims: Feb, 16  
Representative Eshoo Reintroduces Volunteer Services Act: May, 15  
RF Exposure Rules Extension One Small Step for Amateurs...: Mar, 15  
Scanner Bill: How to Balance Cellular/PCS Privacy with Public Service Needs: Nov, 15  
Senator Feingold Listens to Amateurs, Modifies CB Bill: Jun, 15  
Senator Lauds Amateur Radio in Congressional Record: Feb, 16  
Spectrum Pot Continues to Boil: Sep, 16  
Step Forward for the International Amateur Radio Permit (IARP), A: Jan, 16  
Subcommittee Hearing Focuses on Digital TV: Apr, 16  
Support for Feingold CB Interference Bill Crosses the Aisle: Sep, 16  
Telecom Chairman Tauzin Talks with ARRL about Spectrum Concerns: Apr, 15  
Telecommunication Bills, 105th Congress, First Session: Dec, 15  
Text on Little LEO Sharing Agreed: Mar, 16  
Time to Review the Bidding: Jun, 16  
Update on Tauzin Bill: Dec, 16  
What's Not So Helpful: May, 16  
Who's on First at FCC: Jun, 16

**DIGITAL DIMENSION—Column (Horzepa)**  
Computer-Assisted Meteor Scatter: Aug, 90  
Improved CW Reception Using "Stereo": Oct, 97  
Moving APRS for a Clear *Mir*: Sep, 90  
Packet is Dead; Long Live Packet!: Nov, 88  
Softradio: the Future Is Now: Jul, 88  
Surfing the Ham Bands: Jun, 95  
Survey Favors APRS Move: Dec, 94  
Swiss Army Knife of Packet Radio Terminal Programs: Feb, 93  
Using Packet Emergency Protocols: Apr, 91  
War of Web Browsers, The: May, 91  
Write, and They Will Ask: Mar, 92  
Yes, Virginia, There Is a Use for RY: Jan, 100

**DXCC Honor Roll (Kennamer): Jul, 78**

**EXAM INFO—Column (Jahnke)**

ARRL Spring and Fall National Exam Day (Weekends) for '97: Jan, 96  
Nations VECs Meet for Annual Conference: Sep, 95  
New Novice and Technician Question Pools for 1997: Jun, 98  
Questionable Questions in the Question Pools!: Nov, 95

**FEATURES**

**Antennas and Transmission Lines**  
Bent Dipole, The (Mullani): May, 56  
K9AY Terminated Loop, The—A Compact, Directional Receiving Antenna (Breed): Sep, 43  
Let's Talk Transmission Lines (Farmer): Jun, 57  
Low-Budget, Rotatable 17 Meter Loop, A (Hawkins): Nov, 35  
Mini-Five Beam, The (Aurick): May, 58  
Packable Antenna for 80 through 2 Meters, A (Kennedy): Nov, 43  
Portable Ground Plane for Mobile Antennas, A (Aiello): Oct, 69  
Remote Antenna Selector Switch, A (Rosenthal): Aug, 40  
Safety Concerns (sidebar to A Remote Antenna Selector Switch): Aug, 42  
Skyhook for the '90s, A (Daso): May, 31  
Try a Twelfth-Wave Transformer (Emerson): Jun, 43  
Two for the Price of One (Ford): Jul, 56  
Unbalanced Transmission Line Currents and Feed-Line Radiation (sidebar to Let's Talk Transmission Lines) (Farmer): Jun, 59

**Construction/Projects**  
12 Volt Pup: A DC Generator You Can Build, The (Palis): Jun, 45  
40M SLR—a Shielded-Loop Receiver, The (Wissell): Oct, 33  
ATL-10 Antenna Tuner, The (Agsten): Mar, 30  
Audible Meter-Reading Techniques (sidebar to A Relative-Indication Audible Meter Reader) (McCloskey): Mar, 38  
Audio Preamp with AGC and Feedback to Improve AM Fidelity (Burger): Nov, 36  
Build a \$60 Talking Repeater Controller (Cox, Gailunas, Otterson): Feb, 37  
Build a Return Loss Bridge (Ford): Sep, 34  
Computer Control for Mobile Ham Radio Operation (Zygielbaum): Jul, 44  
Computer Keyboard CW Encoder, A (Alspaugh): Dec, 32  
CW With Your H-T (DuBon): Jul, 53  
CycleMaster, The (Richey): Sep, 37  
Designing A Switching Regulator: That Was Then—This Is Now (sidebar to My All-Purpose Voltage Booster) (Ulbing): Jul, 42  
DTMF/LT Decoding Made Easy (Suits): Apr, 34  
High-Efficiency Class-E Power Amplifiers—Part 1 (Chiu, Davis, Lau, Potter, Qin, Rutledge): May, 39  
High-Efficiency Class-E Power Amplifiers—Part 2 (Chiu, Davis, Lau, Potter, Qin, Rutledge): Jun, 39  
Homebrew Your Own Inductors! (Johns): Aug, 33  
Junk-Box Converters for 6 and 2 Meters (Kreuter): Jan, 32  
Microwattter, The (Bramwell): Jun, 33  
MMIC Preamp for 'DC to Daylight', A (Parmley): Nov, 32  
MRX-40 Mini Receiver, The (Bornstein): Sep, 59  
My All-Purpose Voltage Booster (Ulbing): Jul, 40  
Parallel Port Adapter for JVFAK, A (Zehr): Jul, 35  
PIC-Based Digital Frequency Display, A (Heckt): May, 36  
Pocket-Size, Direct-Reading VHF SWR Meter, A (Van Remmen, Jr): Feb, 33  
PortaPeater, The (Craswell): Apr, 37  
Radio Mailbox, The (Petruzelis): Jan, 39  
Relative-Indication Audible Meter Reader, A (McCloskey): Mar, 36

Rugged Coil Forms and Weatherproof Enclosures (Johns): Oct, 48  
Selecting a Meter Movement (sidebar to The Microwattter) (Bramwell): Jun, 35  
Simple Microphone/TNC/SSTV Switch, A (Cieslak): Nov, 55  
Single-Board QRP SSB Transceiver for 20 or 75 Meters, A (Benson): Apr, 29  
Six-Channel Distribution Amplifier, A (Weisman): Nov, 52  
TiCK-2—The Tiny CMOS Keyer 2 (Diana, Sr): Oct, 42  
Triple Tickler, The (Meyer): Dec, 36  
Ultra Simple W1AW Receiver, An (Kitchin, Murphy): May, 34  
Ultra Simple: Receiver for 6 Meters, An (Kitchin): Dec, 39

**General Interest**  
1997 VK0IR Heard Island Expedition, The (Schmieder): Sep, 28  
73 kHz—A New Band for Great Britain (Duell): Mar, 40  
Announcing the Sixth Annual Philip J. McGan Memorial Silver Antenna Award (Gagne): Feb, 49  
Are Radios More Expensive Today? (Minney): Feb, 47  
ARRL Petitions the FCC for Change (sidebar to The FCC's New RF-Exposure Regulations) (Hare): Jan, 49  
BARC Juniors (Casler): Sep, 49  
Boise River Festival, The: An Amateur Radio Showcase (Barrett, Wade): Dec, 28  
Brass Under Fire: World War II Army Signalmen in the Amateur Radio Service (Henderson): Nov, 28  
Broadbanding the Arecibo Dish (Zimmerman): Jun, 28  
BY2QLY—On the Air (Vye): Nov, 45  
Celestial Fox Hunts (Cox): Aug, 44  
Collins 45A—How Arthur Collins Met Robert Goddard, The (McElroy): Feb, 44  
Controlling the World's Largest Telescope (sidebar to Broadbanding the Arecibo Dish) (Elias): Jun, 32  
CQ from Superfort Fifi (Lark, Tuck, Jr): Apr, 40  
Crash of ComAir Flight 3272, The (Falls, Gomes, Jr, Karmol, Lindner): Jun, 49  
Day US Army Invaded W4TLV, The (Collins): Jul, 48  
Digital Audio Radio Service, The (Kleinschmidt): Dec, 44  
FCC's New RF-Exposure Regulations, The (Hare): Jan, 47  
Flood Spurs Growth of ARES Organization (sidebar to The Ohio River Flood of '98) (Norris): Oct, 32  
Get Ready for Phase 3D! Part 1 (Ford): Jan, 28  
Get Ready for Phase 3D! Part 2 (Ford, Lau): Feb, 50  
Get Ready for Phase 3D! Part 3 (Ford, Lau): Mar, 42  
Get Ready for Phase 3D! Part 4 (Ford, Lau): Apr, 45  
Ham Visit to Arecibo (sidebar to Broadbanding the Arecibo Dish), A (Munghan): Jun, 32  
Heathkit's 50th: The Green Turns to Gold (Penson): Apr, 42  
How the IEEE C95.1 Standard Was Developed (sidebar to The FCC's New RF-Exposure Regulations) (Hare): Jan, 48  
How Will the HF Bands Behave as We Enter the New Solar Cycle? (sidebar to Long Live Cycle 23!) (Hall): Jan, 43  
Learning Experience (1996 Simulated Emergency Test), A (Ewald): Aug, 47  
Long Live Cycle 23! (Pocock): Jan, 42  
MediShare International (McShane): Feb, 41  
MFJ: A Silver Anniversary Success Story (Lindquist): Oct, 55  
Much Ado at Dayton 97! (Lindquist): Aug, 28  
NCDXF/IARU International Beacon Project, The (Fabry, Troster): Sep, 47

New Mexico Mountaintop SAR Team (Tull, Jr): Jul, 28  
Ohio River Flood of '97, The (Nie): Oct, 28  
Once Again, a Ham Operator in Command (Keener): May, 43  
Operating from Ground Zero (Baker): Apr, 48  
Radio Coaches (Gagne): Dec, 48  
Radio Clubs of Hungary, The (Pataki): Apr, 28  
Radio Clubs of Yugoslavia, The (Pataki): Oct, 53  
Refurbishing "Boat-Anchors" (Van Prooyen): Jan, 35  
Results of the WRC-99 Opinion Survey (Summer): Feb, 54  
RFI at Arecibo Observatory? (sidebar to Broadbanding the Arecibo Dish) (Zimmerman): Jun, 32  
SAREX: Looking for Tomorrow's Scientists Today (Hollenbeck): Dec, 42  
Satellite Lifeline to Africa, A (Stockman): Jul, 31  
So What's New in the Newest ARRL Antenna Book? (Straw): Jun, 36  
Tips on How to Break in New Coax (Pearce, Ziegenfus): Apr, 44  
Toning Down Alerts (Cox): Nov, 50  
What a Weekend! (Freedman): Mar, 28  
What about a VLF band in the US? (sidebar to 73 kHz—A New Band for Great Britain) (Lindquist): Mar, 40  
What's New About the FCC's New RF-Exposure Regulations? (Hare): Oct, 51  
Get Ready for Phase 3D! Part 5 (Ford, Lau): May, 28

#### Miscellaneous Technical

Easy Way to Copy the Weather Satellites, An (Ruperto): Aug, 36  
Find It and Fix It (sidebar to Tales of Power-Line Noise) (Schetgen et al): Mar, 34  
How's DX?—Now! (Zuerneck): Oct, 46  
Probing the Ionosphere with Radio Signals (sidebar to Sporadic E—A Mystery Solved? Part 2) (Whitehead): Nov, 40  
See the Signals You Hear (Cox): Feb, 28  
Sporadic E—A Mystery Solved? (Whitehead): Oct, 39  
Sporadic E—A Mystery Solved? Part 2 (Whitehead): Nov, 38  
Tales of Power-Line Noise (Flower): Mar, 33  
Wire Gain Antennas for 6 Meters (Witmer): Feb, 66  
"Cyclemaster", The (see Sep, p. 38): Oct, 83  
"Microwattter", The (see Jun, p. 35): Jul, 65

#### FEEDBACK (to 1997 and pre-1997 articles)

1997 School Club Roundup Results (see Sep, 118): Oct, 83  
40M SLR, A - a Shielded Loop Receiver (see Oct, 33) (Wissell): Nov, 71  
48 States on 144 MHz (see Jun, 90) (Pocock): Oct, 101  
AC Power Interference Manual (Loftness) (see Dec '96 New Books, 40): Mar, 64  
Broadbanding the Arecibo Dish (see Jun, 29) (Knisely): Jul, 65  
CW With Your H-T (see Jul, 53): Sep, 83  
Doctor is IN, The (see Aug, 51): Sep, 83  
Drift-Free VFO, A (see Dec 96, 32): Apr, 68  
Dual Rhomboid Revisited, The (see Mar, 89) (Pocock): Apr, 89  
Gelber Monitor (see May, 83): Jun, 48  
Get on 440-MHz ATV, Part 1 (see Oct '96, 36): Jan, 84  
Headset Microphone Feedback (see Sep, 82) (Markey): Nov, 71  
Homebrew Your Own Inductors (see Aug, 35) (Isard): Oct, 83  
Hunting AC Line Noise in an Amateur Radio Receiver (see Dec, '96, 70) (Rosenthal): Feb, 77  
Kenwood TS-570D (see Jan, 75): Apr, 66  
Life Members (see Sep, 66): Oct, 83  
November 1997 Field Day Cover (see Nov, cover): Dec, 72

*QST* Compares: Dual-Band FM Hand-Held Transceivers (see Jul, 58) (Ford): Aug, 66  
*QST* Compares: Dual-Band FM Hand-Held Transceivers (see Jul, 58): Sep, 79  
*QST* photo (see Feb, 84) (Kennamer): Apr, 77  
*QST* Roundup: Three Legal-Limit Linear Amplifiers (see Sep, 72): Nov, 71  
Question-Filled Day at ARRL HQ, A —Part 2 (see Dec '96, 84) (Hennessee): Mar, 88  
Refurbishing "Boat-Anchors" (see Jan, 37) (Van Prooyen): Apr, 68  
Remote Antenna Selector Switch, A (see Aug, 40) (DeLinger): Sep, 83

#### FM & REPEATERS—Column (Mabey)

Emergency Traffic! (Castilonia): May, 87  
Highway to Help, The (Collier): Feb, 92  
Internet-Repeater Connection, The: Dec, 90  
Old Gents' Net, The (Green): Aug, 80  
Repeater Basics: Oct, 95  
Repeater Directory Listings—Unmasked: Nov, 81  
W1DNI with the Weather—And Other Everyday FM Heroes (Sullivan): Jul, 87  
Where Did They Go? (Estey, Mabey): Apr, 84  
Where's the Radio: Jun, 86

#### HAPPENINGS—News (Lindquist)

1997 ARRL/TAPR Confab Set: Jun, 78  
1997 ARRL/TAPR Confab Set: Oct, 85  
1X1 Call Signs Put on Ice: May, 77  
A.C. Gee, G2UK, SK: Aug, 73  
AEA Inks Deal to Sell Product Lines: May, 77  
Allan L. Severson, AB8P, SK: Nov, 73  
Amateur Radio Legend Doug DeMaw, W1FB, SK: Dec, 73  
Amateur Radio to have Permanent Space Role: Feb, 79  
ARRL Again Asks for Primary Allocation at 2300-2305 MHz: Feb, 78  
ARRL Calls on FCC to Privatize Handling of Malicious Interference Complaints: Jun, 76  
ARRL Colvin Grant to Heard Island DXpedition: Feb, 80  
ARRL Debuts New CD, Books: Apr, 75  
ARRL Ham-in-a-Weekend Class a Success (photo): Jun, 76  
ARRL Museum Piece Pays a Visit Home: May, 76  
ARRL Opposes Little LEO Effort to Include 219 to 225 MHz: Apr, 72  
ARRL Section Manager Candidates Unopposed: May, 79  
ARRL Section Managers Elected: Apr, 76  
ARRL Seeks Changes to CW Waiver Rules: Dec, 75  
ARRL Studies New Eavesdropping Bill: Oct, 85  
At Long Last, the FCC Opens Vanity Gate 3: Sep, 68  
ATV Rocket Launches Set: May, 78  
Auction of Marconi Memorabilia Called Off: Apr, 74  
Azden Leaves the US Ham Radio Market: Oct, 85  
Bangladesh Hams Assist in Cyclone Relief Effort: Aug, 71  
Board of Directors Balloting: Jan, 69  
BS7H Shuts Down Early: Jul, 71  
Canadian Effort to Delegate Ham Radio Administration Stalls: May, 80  
Charles Harold Campbell, W1IP, SK: Aug, 73  
Dave Coons, WT8W, is New Great Lakes Vice Director: Feb, 80  
Dayton Hamvention 1997 Attracts Upbeat, Optimistic Crowd: Jul, 69  
Dayton Hamvention and League Join Forces for Year 2000 ARRL Convention (Gagne): Jul, 69  
Dennis E. Mungham, VE3ASO, SK: Jul, 72  
Donald L. Lucas, W0OMI, SK: Apr, 76  
Eimac Sells Glass-Tube Division: May, 77  
Electronic Vanity Applications Flood Gate 3: Oct, 84  
Elmer C. "Chuck" Kunze, W0WVM, SK: Jul, 72

Eugene Black, W2LL, SK: Jul, 72  
Everett M. Renfroe, W9HG, SK: Jul, 72  
FAIRS Monitors Progress Of Ukrainian Digital Grid: Jan, 71  
FAR Offers Scholarships: Apr, 76  
FCC Administrative Law Judge Reaffirms KV4FZ Decision: Dec, 75  
FCC Announces On-line Renewal Form 900: Dec, 74  
FCC Delays New RF-Exposure Rules: Feb, 78  
FCC Established 5.7-GHz U-NII Service: Mar, 67  
FCC Issues Changes in Amateur Radio Rules: Jun, 76  
FCC Issues Gate 3 Call Signs!: Nov, 72  
FCC Issues New Form 610—Old Versions Obsolete: Dec, 73  
FCC Okays Commercial HF Messaging System: Sep, 70  
FCC Opens Vanity Gate 4!: Dec, 73  
FCC Proposes Changes in Spread Spectrum Regs: May, 78  
FCC Proposes New Service for Reallocated 2.3-GHz Segments: Jan, 71  
FCC Proposes, ARRL Opposes Vanity License Fee Hike: Jun, 77  
FCC Resumes Vanity Processing!: Apr, 72  
FCC Upholds Fine for Violating Amateur Rules: Mar, 68  
FCC: Multiple Club Station Call Signs are Legal: Feb, 81  
"Fire that Rocket Now!" Rockoon Launched with Just Seconds to Spare (Brown): Aug, 73  
First SAREX Contact with People's Republic of China Successful: Sep, 69  
Florida judge throws out scanner case against ham: Dec, 74  
Garfield A. Anderson, K0GA, SK: Oct, 86  
Granville "Granny" Klink, Jr, W3AFV, SK: Jul, 72  
Great Debate at Dayton, The: Jul, 70  
"Ham Radio & More" Gets Reprieve: May, 78  
Ham Radio Loses Its Leading Lady: YLRL Founder Ethel Smith, K4LMB, SK (photo): Apr, 73  
Ham radio now an "official" ISS payload: Dec, 76  
Ham-Astronauts Swap Spots Aboard *Mir*: Mar, 67  
Hams Help in "500-Year Flood" Emergency, Recovery: Jul, 70  
Hams on Duty in Western US Flooding: Mar, 66  
Hams Praised for Help in Wake of Devastating Texas Tornado: Aug, 71  
Henry Radio Closes Ham Retail Store: May, 77  
Hope Currier, 73 Managing Editor, SK: Mar, 68  
IARU Administrative Council Considers Future of Ham Radio: Nov, 75  
IARU Region 3 Conference Concludes in Beijing: Nov, 75  
Index Labs' Bruce Franklin and SGC Collaborate on New Transceiver: Jun, 78  
Irving Strobing, N4FLW, SK: Oct, 86  
ITU Concludes Pre-WRC 97 Talks: Jul, 71  
James L. Russell, W9BU, SK: Nov, 73  
Jock White, ZL2GX, SK (Meachen): Jul, 72  
John Avery, VE9IW, SK: Sep, 69  
John R. Shirley, ZL2AM, SK: Nov, 73  
Justin Barton, WA1TZ, SK: Sep, 69  
K2BSA Works *Mir* From National Jamboree: Oct, 84  
K7BV is New *NCJ* Editor: Sep, 71  
KB5UAC Active From *Mir*: Jul, 71  
KB5UAC Grateful for Ham Radio on *Mir*: Sep, 69  
KC5VPF on the air from *Mir*: Dec, 76  
League "Heartily Supports" FCC Proposal to Ease International Operating: Feb, 79  
League Calls on FCC to Kill Anti-theft System Petition: Aug, 74  
League Files Spread Spectrum Reply Comments: Sep, 70

League Petitions for RACES Flexibility:  
May, 79

Leo Meyerson, W0GFQ, receives Hamvention's "Ham of the Year" Award: Aug, 72

Leon "Lee" Faber, W7EH, SK: Oct, 86

Little LEO Battle Moves to Next Level: May, 76

"Lowfwer" Author, Experimenter Ken Cornell, W2IMB, SK: Mar, 68

MARS Global Surveyor Relay Test a Success: Mar, 69

Massachusetts PRB-1 Invoked to Axe Local Tower Law: Nov, 74

Maxim Memorial Award Nominations Open: Feb, 81

Milwaukee Ordinance Restricts Towers: Oct, 85

"Mr. VHF," Edward P. Tilton, W1HDQ, SK: Jun, 77

N4XKG Plugs Ham Radio on The Today Show: Nov, 75

NASA Gives KC5VPF the Green Light for *Mir* Stay: Nov, 72

New 1X1 Special Event Call Sign Rules Implemented: Oct, 84

New Faces on ARRL Board: Jan, 69

New Jersey TVI LawsuitAppealed: Sep, 71

New Section Ups the Ante on SS Clean Sweep: Aug, 72

New Yorker's Ham Ticket Suspended for 15 Months: Aug, 71

NJ Judge Rules Interference Out of His Hands: Jun, 78

Nominees Sought for ARRL Board of Directors: Jul, 74; Aug, 75

North American Digital System Directory to be On-Line: Mar, 68

NRAO and WB Cooperate in *Contact* Filming: Aug, 72

NTIA Report Bullish on Additional HF Bands: Feb, 80

NU1AW Inaugurated During IARU Contest: Sep, 68

NU1AW: International Amateur Radio Union Club Station: Jan, 70

One Less Little LEO: Oct, 85

Past ARRL President Carl L. Smith, W0BWJ, SK: Mar, 68

Paving at ARRL (photo): Nov, 74

Permission Granted for Linenger to Ham It Up from *Mir*: Apr, 73

Phase 3D Launch Delayed: Feb, 78

Phase 3D Launch Delayed Two Weeks: Aug, 71

Phase 3D Launch Put Off Until September: May, 76

Phase 3D Looking for a New Ride: Nov, 73

Philip F. Wight, W5UHK/V56DR, SK: Oct, 86

QST Author Carl Heinen, W0MCN, SK: Mar, 68

QST Names New "YL News" Editor: Sep, 71

Radio Amateur Callbook Goes CD-ROM Only: May, 77

Radio Shack Takes HTX-204 Dual-Band H-T Off the Market: Jun, 78

Repeat Nominating Solicitation: Jan, 72; Jul, 73; Aug, 74

Robert G. Osborn, Jr, N6MSO, SK: Jul, 72

Robert M. Morris, W2LV, SK: Dec, 75

RS-16 Satellite in Orbit: May, 77

Rudy Severns, N6LF, is New *QEX* Editor: Oct, 86

SAREX Team Wins NASA Award: Nov, 74

School Contacts are a "Go" in the Wake of *Mir* Fire: May, 80

Schools Selected for STS-83 SAREX Contacts: Mar, 67

September Phase 3D Launch Doubtful: Sep, 68

Silver Lakes Middle School contacts *Mir* (photo): Apr, 72

Sister Alverna Retires from Handi-Ham System (Tice): Jul, 72

Solar Cycle 23 Project: Stellar Conclusions: Mar, 68

Solar Flux tops 100 for First Time in Three Years: Nov, 73

STS-38 Refly is a "Go" for July with SAREX on Board: Jun, 77

Thousands put Heard Island DXpedition in their logs!: Mar, 66

Threat Update: Synthetic Aperture Radar Systems: Jan, 72

Three Directors Face Competition: Oct, 85

Transatlantic Anniversary a Success: Feb, 81

Twenty Meters Opens for Queen's Ham Radio Debut: Sep, 70

Vanity Call Signs Spark Renewed Interest in Hobby: Jan, 70

Vermont Section Manager Recall Fails: Mar, 67

Volunteer Bill Passes Congress!: Jul, 70

W1AW Antennas Get Repaired, Upgraded (photo): Feb, 80

W2AX Attempts to Fill Shipboard CW Gap: Jul, 72

World Championship in High Speed Telegraphy Set: Apr, 75

World Radiocommunication Conference 97 Opens in Geneva: Nov, 72

WRC-97 Under Way in Geneva: Dec, 74

WRC-99 Committee Supports Morse Code Treaty Requirement for HF: Feb, 79

WRTC 2000 to be Held in Slovenia: Apr, 75

**HINTS & KINKS—Column (Schetgen)**

Automatic Transmitter Keying for Screwdriver (Mobile) Antenna Adjustments (Lloyd): Jan, 82

Band-Data Connector for the Yaesu IFT-1000MP, A (Bratton): Jul, 67

Broadband Matching for HF Mobile Whips (Lewis): Jan, 81

Build a Vacuum-Tube Product Detector (Van Prooyen): Jun, 72

Clothes Washer RFI (Hemby): Oct, 80

Computer control for IC-245 Transceivers (Gregory): Jul, 66

Extension Handles as Lightweight Antenna Supports (Rolek): Jun, 73

Extension Ladder Support for Small Antennas, An (Haughton): Oct, 80

Eye to Eye Antenna Connections (Guillaume): Feb, 75

Eyeglass Cases Protect Removable Front Panels of Mobile Radios (Seeley): Jun, 73

Fast and Easy Printed Circuit Boards (Link): May, 72

Faster Packet with the Uniden HR2600 Transceiver (Wheeler): May, 73

Fix Stuck Meters with Window Spray! (Mandeville): Oct, 80

Fold-over, All-Band Mobile Antenna, A (Drager): Nov, 68

Garage Door RFI (McCook): Nov, 69

Good Sidetone Oscillator, A (Bramwell): Dec, 70

IC-706 Mike Problem (Young): Nov, 69

Mike-Switch Cures (Hulbert): Aug, 68

Monopole Tower Antenna (Wolff, Jr): Mar, 78

Moonglow—Tape that Glows in the Dark (Sackey): Mar, 79

More on the Drift-Free VFO (Makhinson, Lau): Jan, 81

New Status Indicator for the Handbook Deluxe Soldering Station, A (Jacquet): Jan, 82

Paint Spray Heads as Knobs (Joy): Dec, 70

Pause-Scan Circuit for the Alinco DT-100 and Other Radios, A (Mindy): Sep, 80

Radio Shack VOX with the Alinco DJ-850 H-T (Wonoski): Mar, 79

Replacing the Memory Battery in the Yaesu FT-2400 (Klocko): Sep, 81

Reverse-a-Probe (Edwards): Aug, 67

Rewinding Relays for 12 V Operation (Wade): Dec, 69

Simple Voice Keyer, A (Brock-Fisher): Sep, 80

Source for High-Current Relays, A (Rolek): Jun, 73

Speaker-Mike Modifications to Generate a 1750-Hz Tone Burst for European Repeater Operation (Chidester): Feb, 74

Three-Band, No-Tune Apex Loading Network for an 80-Meter Inverted-L, A (Lee): Apr, 67

"Thump Killer" Modification for KK7B's CW Transceiver, A (Campbell, Fifield): Feb, 74

Tight-Place Test Leads (Frazier): Nov, 69

Yaesu FT-840/KAM-Plus Interconnection (Schultz): Aug, 67

**HOW'S DX?—Column (Kennamer)**

9N1UD On the Air!: Dec, 79

9X4WW Story: Topband from Kigali, The (or, Why Did the Beverage Cross Road?): Jul, 75

Bouvet...For the Swift!!: May, 81

Contest DXpedition to Mongolia—The JT1Z Story: Jun, 82

DX Clubs: Mar, 82

General Summary of Propagation from VK0IR to the US and VE, A (Luetzelschwab): Oct, 88

Heard Island DXpedition, 1997, The (Alphin): Jan, 87

New Orleans International DX Convention, The: Feb, 84

Northern California DX Foundation, The: Feb, 84

Return to Chatham (Grotehusmann): Nov, 77

Shangri-La in Beijing: Apr, 77

St. Peter and Paul Rocks—A Hard Nut to Crack (Leite): Aug, 76

Trip into History: Feb, 83

VK0IR...The Book: Sep, 84

**IT SEEKS TO US—Editorial (Sumner) p 9**

Are We Our Own Worst Enemy?: Dec

ARRL: A Working Democracy, The: Jul

Let's Put Spectrum Challenges in Perspective: Aug

Magic: Apr

Magic II: VHF is Magic, Too!: Sep

More on Little LEOs: Feb

Morse Exemptions: Oct

New Tool for Enforcement?, A: Jun

Paying Our Dues: Mar

Public Service in the 21st Century: May

Strong Defense, A: Nov

What if they Gave an Auction, and Nobody Came?: Jun

What's Our Future in Emergency Communications?: Jan

**LAB NOTES—Column (Lab Staff)**

Capacitor Basics: Jan, 85

**NEW BOOKS [Author] (Reviewer)**

Beyond Courage [Aros, Ternan] (Micket): Aug, 93

Build Your Own Intelligent Amateur Radio transceiver [Henderson] (Danzer): Jul, 34

Collins Amateur Radio Equipment Video Spotter's Guide, The [Soo] (Lindquist): May, 90

Crystal Set Projects: 15 Radio Projects You Can Build [Hewes] (Ford): Aug, 102

Encyclopedia of Electronic Circuits on CD-ROM [Graf and Sheets] (Danzer): Feb, 57

Introduction to Radio Wave Propagation, An [Lee] (Pocock): Oct, 67

K1BV DX Awards Directory, The [Melinovsky] (Danzer): Nov, 71

Little Pistol's Guide to HF Propagation, The [Brown] (Pocock): Mar, 65

McGraw-Hill Circuit Encyclopedia and Troubleshooting Guide, Vol 2 [Lenk] (Wolfgang): Feb, 46

Micro Space Craft [Fleeter] (Ford): Jan, 108

Radio-Frequency Electronics Circuits and Applications [Hagen] (Danzer): Jul, 43

Shortwave Receivers, Past & Present [Osterman] (Brogdon): Apr, 71

Transmitters, Exciters and Power Amplifiers 1930-1980 [Moore] (Lindquist): Feb, 36

W6SAI HF Antenna Handbook [Orr] (Danzer): May, 47

**NEW HAM COMPANION (Ford)**

Adventure of Ham Radio, The (Gay): Aug, 55

APRS on the Web (Sidebar to Position Reporting with APRS) (Parry): Jun, 62  
 APRS via Outer Space (Lehmann, Winder): Mar, 53  
 Bent Dipole, The (Mullani): May, 56  
 Catch a Falling Star (Kleinschmidt): Oct, 63  
 Crystal Radio, The (Evison): Dec, 56  
 CW With Your H-T (DuBon): Jul, 53  
 Field Day from the Summit of Mt San Jacinto (Aubert): Feb, 60  
 Fun-Filled Morning with Ham Radio, A (Lee): Apr, 55  
 Getting Started with Slow Scan Television (Glidden): Sep, 53  
 Heading in a New Direction (Collier): Jan, 53  
 HF QRP "Foxhunting" (Mugleston): Dec, 58  
 Height Really Does Matter! (Lehman): Aug, 52  
 iPhone to Israel! (Danzer): Jul, 52  
 Jamboree on the Air—JOTA'97 (Swanson): Oct, 68  
 Leonid Meteors: Potential Satellite Killers? (sidebar to Catch a Falling Star) (Kleinschmidt): Oct, 64  
 Let's Talk Transmission Lines (Farmer): Jun, 57  
 Me? Operate W1AW? (Peach): Apr, 52  
 Mini-Five Beam, The (Aurick): May, 58  
 More SSTV Information on the Web (sidebar to Getting Started with Slow Scan Television) (Glidden): Sep, 54  
 Morse at the Movies (Cox): Apr, 58  
 MRX-40 Mini Receiver, The (Bornstein): Sep, 59  
 Never Say "Never" (Hope): Jan, 52  
 New Heights for ATV (Suits): Feb, 63  
 On the Road: The Joys of HF Mobile (Ford): Dec, 51  
 Phase 3D Jump Start, A (Kelly): Sep, 57  
 Phonetic Dilemma, The (Aurick): Apr, 56  
 Portable Ground Plane for Mobile Antennas, A (Aiello): Oct, 69  
 Portable Packets (Nichols): Mar, 52  
 Position Reporting with APRS (Parry): Jun, 60  
 Radios in the Kitchen (Elliott): Aug, 56  
 Right Information...To The Right People...In The Right Way, The (sidebar to Radios in Kitchen) (Elliott): Aug, 57  
 Simple Microphone/TNC/SSTV Switch, A (Cieslak): Nov, 55  
 Six-Channel Distribution Amplifier, A (Weisman): Nov, 52  
 SSTV Software on Line (sidebar to Getting Started with Slow Scan Television) (Glidden): Sep, 55  
 Tallyho 6 Meters! (Ford): Jun, 64  
 Test Your Knowledge! A tricky test for homebrewers. (Silver): May, 60  
 Test Your Knowledge! Back to Basics—Ohm's Law, Decibels and Units (Silver): Jan, 58  
 Test Your Knowledge! Do we all speak the same language? (Silver): Jul, 55  
 Test Your Knowledge! Emergency operating and preparedness (Silver): Aug, 58  
 Test Your Knowledge! How well do you know your connectors? (Silver): Dec, 55  
 Test Your Knowledge! How well do you understand batteries? (Silver): Nov, 49  
 Test Your Knowledge! Rules and Regs! (Silver): Apr, 57  
 Test Your Knowledge! Something old, something new... (Silver): Mar, 51  
 Test Your Knowledge! Try this Antenna Brainbuster! (Silver): Feb, 62  
 Time on Your Side (Cox): May, 61  
 Toning Down Alerts (Cox): Nov, 50  
 Transatlantic Multimode Experience (Bishop): Apr, 53  
 Twister, a la Antenna! (Taylor): May, 54  
 Two for the Price of One (Ford): Jul, 56  
 Unbalanced Transmission Line Currents and Feed-Line Radiation (sidebar to Let's Talk Transmission Lines) (Farmer): Jun, 59  
 Upgrade Your Memory! (Kleinschmidt): Jan, 54  
 VGA/Super-VGA Video Cards (sidebar to Getting Started with Slow Scan Television) (Glidden): Sep, 53

Weather Data To Go (Cox): Mar, 48  
 What's Your Grid? (Sidebar to Tallyho 6 Meters!) (Ford): Jun, 65  
 Wire Gain Antennas for 6 Meters (Witmer): Feb, 66  

### NEW PRODUCTS

2 W and 5W RF Loads from Bird: Dec, 38  
 100 W FM/SSB Amplifier for 2 Meters (Maha Communications): Sep, 79  
 300 W Roller Inductor Antenna Tuner from MFJ: Nov, 107  
*1997 AM Radio Log* from the National Radio Club: Jun, 75  
*1997 Edition of Police Call Plus Now Available* (Hollins Radio Data): May, 42  
*1997 Shortwave Frequency Guide, The*, from Klingenfuss Publications: May, 42  
 3CX300A1 Power Triode from Svetlana: Nov, 57  
 40-Meter Mantis from Cubex, The: Nov, 69  
 200-W Low-Pass Filter from MFJ, A: Dec, 38  
 AC Line Filters from Electronic Specialists: Apr, 49  
 Affordable Boom-Microphone Headsets (Warren Gregoire & Associates): Jan, 89  
 Affordable Dual-Band Hand-Held Amplifier from Mirage: Mar, 50  
 Aircom Plus Coaxial Cable from SSB Electronic USA: Jul, 54  
 AK-1 "Atomic Keyer" Kit from Embedded Research, The: Mar, 79  
 Alinco's EDX-2 Automatic Antenna Tuner: Jan, 92  
 AN-7 Slimline 80-2 Meter Mobile Antenna from Palomar Engineers, The: Apr, 71  
 Antique Radio Schematics and Service Info on CD-ROM (Radio Era Archives): Jan, 46  
 ARB-700 Solid-State Amplifier Keying Interface from Ameritron: Aug, 95  
 ASAPS for Windows—HF Propagation Prediction Software from IPS (d'Avignon): Mar, 65  
 Auto Voice IDer from Racom: Feb, 75  
 Automatic Antenna Tuner Kit for QRPs (LDG Electronics): Aug, 100  
 B+K's Model 2880 Digital Multimeter Talks to Your Computer: Jun, 63  
 Belden 9913F Coaxial Cable from the RF Connection: Jun, 85  
 Brighteyes: Hands-Free "Eyeglass-Style" worklights (EBCO Manufacturing): Jun, 59  
 BS-25 Automatic Battery Saver from Oak Bay Technologies, The: Oct, 45  
 "Bury-Flex" Low-Loss Coaxial Cable from Davis RF: May, 91  
 Cable X-perts Adds Alpha-Delta Antenna Switches to Line-up: May, 73  
 Call Sign Extension Plate from W1TK: Dec, 38  
 Cellmate Battery Charger/Conditioner from VCI: Sep, 36  
 "Clamp" Meters from B+K: Jan, 92  
 Class E Amplifier Kits (Puff Distribution): Nov, 94  
 Cleartone Communications Speaker from MFJ, The: Dec, 72  
 Coaxial Jumpers from Cable X-perts: Oct, 83  
 Code Flasher, The (The Lanz Company): Feb, 43; Mar, 65  
 Comet SMA-501 Dual-Band Antenna for Hand-Helds: Oct, 45  
 Contest Card from United Microsystems, The: Apr, 97  
 Custom Photo/QSL Displays from Shack Attack: Nov, 51  
 CW Audio Filter Kit for Ten-Tec's Argosy, A (Embedded Research): Mar, 79  
 Dedicated WWV Receiver from Hamtronics, A: May, 93  
 Drake's SW8 Shortwave Receiver Gets an Improved Synchronous Detector: Jan, 82  
 Dualband Mobile Antennas from Premier Communications: May, 73  
 Easytrac Surface Power System, The (Intermatic): May, 75  
 EF86/6267 Pentode from Svetlana: Aug, 68

Entry-Level SW1 Shortwave Receiver from Drake: Jan, 57  
 FM Morse: Code Training Interface for Your VHF Transceiver (Advanced Amateur Radio Products): Jul, 65  
 Gelber Monitor System: May, 83  
 Ham Radio Data, Humor, Lore: It's All in the Jadebook (Jade Products): Jul, 54  
 Hammy Bears (Personalized Photo): Nov, 51  
 Hand-Held Scope Calibrator from Novatech: May, 57  
 HEX-BEAM Series II from Traffie Technology: Sep, 60  
 High-Pass TVI Filter from MFJ: Jul, 47  
 High-Performance Mag-Mount Dual-Band Antenna from MFJ: Feb, 101  
 High-Performance True RMS Clamp Meter from B+K: Feb, 65  
 Improved U-105 Antenna Rotator from Philips ECG: Oct, 45  
 In-Line Surge Protector from Lynics: May, 71  
 International 9092 RG-8X Coaxial Cable from the RF Connection: Jun, 35  
 Intro-Aural Mikes from Ikaros: Apr, 71  
 "Island Keyer" Kit from Milestone Technologies, The: Jun, 35  
 Jade Products' Curtis Keyer Kit: May, 33  
 JAN Crystals Offers Expanded Catalog: Mar, 79  
 K1CC's "KIY": A Computer Interface for Kenwood, ICOM and Yaesu Receivers, Transceivers (Assarabowski): Apr, 97  
 Kantronics' Pager Handbook for the Radio Amateur: Mar, 79  
 KC2 "Do Everything" QRP Accessory Kit from Wilderness Radio, The: Jan, 51  
 Kenwood Amateur Radio Self-Study package Now Available: Apr, 33  
 "Kleen Line" UPSs from Electronic Specialists: Jul, 57  
 Klingenfuss Frequency Guides: Jun, 85  
 Legal-Limit VHF/UHF Amplifiers from Mag Products: May, 97  
 License Certification Service Gives Your Ticket That "Old-Style" Appearance: Apr, 49  
 Liquid Electrical Tape from Star Brite: Nov, 54  
 Low-Profile 12-V Supplies from Tripp Lite: Mar, 65  
 Low-Voltage Alarm for 12-V Auto/Marine Systems (Failsafe Devices): Aug, 68  
 "Match Alert" SWR Alarm from RF Applications, The: Jan, 89  
 MFJ's "Auto Tuner Extender": Feb, 101  
 MFJ's Matchmaker: Feb, 43  
 MFJ-781 DSP Filter for Multimode Data Controllers, The: Mar, 50  
 Micro DTMF Decoder from Optoelectronics, The: Dec, 38  
 Microwave Power Modules/Transverters from Parabolic AB: Jan, 92  
 Milestone Adds Rainbow Kits to Line of Ham Radio Products: Oct, 83  
 Miniature Weather Satellite Receiver for Your Laptop Computer (OFS WeatherFAX): Oct, 81  
 Mirage B-310-G 2-Meter Amp/Preamp from MFJ, The: May, 75  
 Multiband HF/VHF Antennas from Dynamic Electronics: Jun, 75  
 New "Ham Gear" Offerings (Shirts & Caps Inc): Jul, 39  
 New Antenna Mart Catalog: Jun, 75  
 New Bands for the Wilderness Radio Sierra: Jan, 114  
 New Bird Wattmeter Handles Analog and Digital RF Measurements: Feb, 87  
 New Ladder Line Products from Cable X-perts: Jun, 75  
 New Line of Hand-Held Scanners from Rehm: Nov, 37  
*Night Pattern Book*, The, from The National Radio Club: May, 38  
 Nye Engineering's Digital S Meter: Feb, 87  
 P1 Series: Digital RF Wattmeters with Serial Computer Interfaces, The (RF Applications): Jul, 57  
 P100A Digitally Driven HF/UHF Wattmeter from RF Applications, The: Feb, 87

Paddlette Keyer Paddle: Jul, 34  
 PFS-1 Field-Strength Meter from Palomar Engineers, The: Aug, 100  
 Pocket Guide to Collins Amateur Radio Equipment 1997 Calendar (Trinity Graphics Systems): Jan, 38  
 Potting Compound is Electrical Insulator, Thermal Conductor (Master Bond): Mar, 81  
 Power Supply Upgrade Kit for Collins 30L-1 Amplifiers (Steve Pautard, WN4I): Dec, 72  
 PowerClear Digital Signal Processor from SGC, The: Jun, 44  
 Powerport 149, The: Rechargeable, portable AC and DC power (Cutting Edge): Aug, 68  
 Probe Version 3.0 for Optoscan Interfaces (DataFile Inc): Jul, 54  
 PS-40 Switching 13.8-V Power Supply from Kenwood, The (Kenwood): Jan, 46  
 "Queenbee", The - Four-Element, 6-Meter Quad from Cubex: Feb, 65  
 R139 Weather Satellite Receiver from Hamtronics, The: Nov, 51  
 Seven-Channel VHF Weather Alert Receiver from Hamtronics: Nov, 54  
 SGC-231 Autotuner from SGC: Nov, 57  
 Skeleton Cone Multiband HF Antenna From Genesis: Jul, 47  
 SSB Electronic Now US Dealer for Mutek and Parabolic: Apr, 90  
 Svetlana's 4CX400A High-Performance Tetrode: Feb, 77  
 Switchcraft Expands its Micro-Plug Line (Raytheon): Feb, 77  
 "Tape-Jay" Stealth Antenna for 2-Meter FM, The (HAMCO): Feb, 101  
 TE-64D Tone Encoder from Communication Specialists, The: Apr, 71  
 TE-NE-KE Keyer Paddle for Portable, Mobile CW (Mason): Sep, 79  
 Ten-Tec QRP CW Transceiver Kits: Apr, 47  
 Terminated, Frequency-Independent Vertical Antennas from Sommer: May, 57  
 Timewave's DSP-59Y High-Performance DSP Plug-In Module for Yaesu SP-5 and SP-6 Outboard Speakers: Mar, 39  
 TL-3 Synchronized Real-Time Clock from TrueTime, The: Mar, 39  
 Tower Jack: Put Up or Take Down with Ease: Jul, 65  
 Updated Gordon West Technician No-Code Plus Book and Tapes: Nov, 44  
 Upgraded HS-1500 HF Mobile Antenna System from High Sierra: Oct, 83  
 Vibroplex Straight Key: Jan, 38  
 Warren Gregoire TR-2000 Headset Connectors, PTT Box: Sep, 79  
 XP-40 Series "DJ2UT Multiband Beams" from Sommer, The: Apr, 92  
 Xplorer Test Receiver from Optoelectronics, The: Feb, 87

## NEW SOFTWARE

Add *ClusterLog* to Payl Software's *DXLOG*: Jan, 82  
*Code 3-Gold*: An HF/VHF Digital Data Decoder from Computer Aided Technologies: Apr, 97  
*Copy This and Pass CW* CD from Buckmaster: Nov, 34  
*HamCalc* version 20: Still Free, Still Functional! (Murphy): Jan, 114  
*Hamcalc* Version 23: Get it Right from the Source! (Murphy): Jun, 35  
 New Control Software for ICOM Transceivers (Hanson): Mar, 41  
 Pasokon's *TV Lite* SSTV Software (Absolute Value Systems): Jun, 75  
*Police Call Plus* Now Available on CD-ROM (Hollins Radio Data): Jun, 75  
*PROLOG* version 3.87 (Ford): Sep, 83  
 RTTY Contest Software from Wyvern Technology: May, 83  
 Satellite Tracker Nova for Windows by NLSA: Jan, 102  
 TAPR-97 CD-ROM: Jun, 59  
 Updated *WJ2O Master QSO Logger* Now Available: May, 42

[*WinPix Pro* v 1.6] Available from GV Associates: Jan, 89  
*WIZARD*, Affordable HF Propagation Prediction Software from Kangaroo Tabor: May, 38

**OP-ED—Column**  
 Communications: A Defense Against Restrictive Ordinances (Bickle): Aug, 88  
 DXpeditions and American Principles: Must We Choose? (Shands): Jun, 101  
 I Feel Great—Thanks for Not Asking! (White): Feb, 100  
 Welcome (and Much Needed) Shot in the Arm, A (Bowles): Apr, 90

**ORGANIZATIONAL—ARRL**  
 ARRL Laboratory Tackles RF Safety, Other Issues (sidebar to The Year in Review 1996): May, 51  
 Blast from the Past, A (photo: K1ZND—now K1ZZ) (Kennamer): Mar, 82  
 Board Meets in Special Session (Palm): Jan, 61  
 Board Says "No Change" to International HF Morse Code Requirement (Palm): Mar, 58  
 Board Supports Spectrum Protections, Band Plans, VE Rules Change (Lindquist, Palm): Sep, 61  
 Conclusions Regarding WRC-99 (sidebar to Board Says "No Change" to International HF Morse Code Requirement) (Palm): Mar, 60  
 Expect the Unexpected! (Ewald): Sep, 107  
 Major ARRL Operating Events and Conventions—1997: Jan, 59  
 Member Comments Sought on Licensing Structure (Sumner): Mar, 55  
 Our Washington Presence Pays Off (sidebar to The Year in Review 1996): May, 49  
 Promoting Ham Radio in Schools, Space, Scouting (sidebar to The Year in Review 1996): May, 50  
 Summary of Major Board Actions (sidebar to Board Says "No Change" to International HF Morse Code Requirement) (Palm): Mar, 59  
 Year in Review 1996, The: May, 48

**At The Foundation—Column (Carcia)**  
 Hams...Proof-Positive Role Models!: Jul, 96  
 Lonestar Lead-in to 1997!: Jan, 102  
 Mission Accomplished! (Bushman): Nov, 90  
 Our 1997 Scholarship Winners: Sep, 98  
 Spotlight On The Jesse Bieberman Meritorious Membership Program: May, 96  
 Spring Fever, Once Again!: Mar, 93

**Club Spectrum—Column (Ewald)**  
 Anniversary Celebrations Abound (Ewald): Jul, 95  
 Back to Ham Night (Ewald): Jan, 101  
 Club Members are Honored (Ewald): Sep, 100  
 DeForest ARC Operates Parade Float (Ewald): Nov, 89  
 How to Become an Affiliated Club (Ewald): Mar, 94  
 What's Going On? (Ewald): May, 94

**Elections**  
 Section Manager Election Notice: Jan, 72; Feb, 82; Apr, 76; May, 80; Jul, 73; Aug, 74; Oct, 87; Nov, 76  
 Section Manager Election Results: Jan, 72; Oct, 86

**Moved & Seconded**  
 1997 Annual Meeting of the ARRL Board of Directors, January 17-18, 1997 (Sumner): Mar, 61  
 1997 Second Meeting of the ARRL Board of Directors, July 18-19, 1997 (Sumner): Sep, 64  
 Minutes of the Executive Committee Number 449, July 19, 1996: Jan, 67

Minutes of the Executive Committee Number 450, October 25, 1996: Jan, 68  
 Minutes of the Executive Committee Number 451, Albuquerque, New Mexico, January 16, 1997 (Sumner): Mar, 64  
 Minutes of the Executive Committee Number 452, St. Louis, Missouri, April 12, 1997: Jun, 80  
 Minutes of the Executive Committee Number 453, July 17, 1997 (Sumner): Sep, 67  
 Minutes of the Executive Committee Number 454, Philadelphia, Pennsylvania, October 11, 1997 (Sumner): Dec 77  
 Special Meeting of the ARRL Board of Directors, October 24-26, 1996: Jan, 63

**W1AW Schedule:** Jan, 104; Feb, 101; Apr, 99; May, 112; Jun, 38; Jul, 83; Oct, 38; Nov, 92

**PRODUCT REVIEW (Lindquist)**  
 Alpha Delta Communications Model VRC Variable Response Console (Lindquist): Apr, 65  
 AOR AR7030 Communications Receiver (Danzer): Jun, 68  
 Cushcraft R7000 Multiband Vertical Antenna (Lindquist): Aug, 59  
 Down East Microwave Model DEM 50-28CK 6-Meter Transverter Kit (Swanson): Feb, 71  
 Drake TR270 FM Transceiver (Ford): Nov, 64  
 Expanded Product Review Test Reports Available: Feb, 73  
 ICOM IC-756 MF/HF/VHF Transceiver (Swanson): May, 63  
 ICOM IC-821H VHF/UHF Multimode Transceiver (Ford): Mar, 70  
 ICOM IC-R8500 Communications Receiver (Moore): Apr, 61  
 Japan Radio Co. NRD-535D HF Receiver (Wolfgang): May, 68  
 Kenwood TS-570D HF Transceiver (Wolfgang): Jan, 73  
 M2 2M12 Yagi Antenna (Ford): Nov, 63  
 Portable Shortwave Receiver Roundup, A (Ford): Aug, 60  
 QST Compares: Dual-Band FM Hand-Held Transceivers (Ford): Jul, 58  
 QST Compares: Four High-Power Antenna Tuners (Lindquist): Mar, 73  
 QST Compares: Economy and No-Frills 2-Meter Hand-held Transceivers (Kleinman): Dec, 60  
 QST Roundup, A: Three Legal-Limit Linear Amplifiers (Lindquist): Sep, 72  
 Radio Shack Model 21-527 Digital SWR/Power Meter (Ford): Jun, 71  
 Radio Shack Probe-Style Oscilloscope (Wolfgang): Aug, 65  
 Raibeam RB-206B Two-Element 6 Meter Beam (Jahnke): Sep, 77  
 SCS PTC-II Multimode Controller with PACTOR-II (Ford): Jan, 77  
 Selling of the TS-570D, The (sidebar to Kenwood TS-570D HF Transceiver): Jan, 76  
 Solicitation for Product Review Equipment Bids: Feb, 73; Apr, 66; Oct, 79; Nov, 67; Dec, 68  
 SSB Electronic LT2S MK II 2-Meter Transverter (Wilson): Nov, 62  
 TASCO Electronics RSC-70U Slow-Scan TV System (Wolfgang): Apr, 59  
 Ten-Tec Centaur Model 411 HF Linear Amplifier (Lindquist): Jun, 66  
 Ten-Tec OMNI VI Plus MF/HF Transceiver (Wolfgang): Nov, 58  
 Tigertronics BayPac BP-2M Multimode Modem (Lindquist): Apr, 64  
 Timewave DSP-59Y Audio Noise Reduction Filter (Danzer): Sep, 78  
 Tune in the World for Less Than \$300: Drake SW1 and Radio Shack DX-394 (Lindquist, Moore): Oct, 77  
 Two Ultra-Accurate Clocks: The Time Machine and The Zeit (Ford, Micket): Jan, 79

Yaesu FT-600 MF/HF Transceiver (Ford):

Feb, 68

Yaesu FT-920 MF/HF/6 Meter Transceiver (Kennamer): Oct, 72

#### PUBLIC SERVICE—Column (Palm)

Amateur Radio at the World Championship Triathlon (Bellamy): May, 84

ARES Nonemergency, The (Robinson): Aug, 81

ARRL Year of Public Service: Feb, 88

ARRL Year of Public Service, The—Join The ARRL Field Organization: Sep, 88

"Coast Guard, Coast Guard...." (Stearns): Jun, 87

CW—An Unfortunate Casualty of Technology (sidebar to Network Theory and the Design of Emergency Communications Systems, part 1 of 2) (Fordham): Oct, 93

Four Reasons... (Robinson): Sep, 87

Ham Huminatarians at Wisconsin Special Olympics (Larson): Dec, 84

Hams Support Angeles Crest 100 (Hubbard): Apr, 81

Hospital Emergency Communications—Fulfilling the Mission (Moell): Dec, 83

Hurricane Danny Puts Alabama's Hams to Test (Moore): Nov, 82

Hurricane Watch Net Home Page Up (Herman): Dec, 84

Kentucky Hams are the Eyes and Ears of the National Weather Service (McCallum): Jan, 93

Millers Reach No. 2: The Great Alaskan Wildfire (Strain): Mar, 85

Network Theory and the Design of Emergency Communication Systems—Part 1 (Fordham): Oct, 92

NTS Leadership Convenes in Newington: Jul, 84

Originating ARRL Radiograms (Davis): Feb, 88

#### STRAYS

Add Your E-Mail to the WM7D Call Sign Database (Downing): Aug, 96

AHA! (Aho): Sep, 103

Another Result of Ham Radio Friendship (Raju): Apr, 94

Antique Radio Magazine: Sep, 120

Astronomy Net (Plasencia): Jun, 97

Auction in Dallas, An (Peters, Kitto): Feb, 99

Automobile Tags Wanted (Richmond): Nov, 80

Boy Scouts on ATV (Perasovich): Jun, 103

Brazilian YL Net (BRYLA): Feb, 104

Calgary Stampede City Award (Calgary ARA): Mar, 41

Call for Technical Papers for *QST*: Apr, 94

Case of Mistaken Identity, A (Mullin): Jan, 89

Collins Collectors Association (Miller): Feb, 49

Don't Believe Everything You Read: Mar, 84

Father-and-Son Vanity Call Signs (Trampler, Jr, Trampler, Sr): Sep, 97

Fitting QSL Card, A (Dowell): Sep, 94

Five Ham Brothers (Williams): Mar, 98

For Hams, It's a Small World (Columbus, O'Poulson): Sep, 101

Free Gear (Davis): Jan, 89

Greater Cincinnati ARA, The (photo) (Turner): Feb, 104

Ham Radio Class Ring (Hazard): Jun, 103

Happy Call Sign Coincidence, A (Denton): Feb, 49

International Ice Patrol (McKnight): Sep, 97

It's Never Too Late...: Mar, 54

Key West ARC (Godwin): Mar, 84

Lifetime Renewable Prescription (Lund): Oct, 101

Long Time, No See (Langley, McCoy): Jan, 89

Make Points with the FCC (Linthicum): Sep, 94

Mel Card, W1CUH seeks correspondence:

Nov, 81

Mill Software, The (Farrior): Oct, 108

New DSP RTTY Demodulator Software (Glassey): Feb, 104

New Net for Hams with Disabilities (Mauro): Feb, 49

Now Listen Up, Pilgrim... (PAWA): Mar, 41

Organizing SAC Museum Exhibit for 1998 (Schleck): Oct, 47

Parts for the QRP Homebrewer (Buckeye Electronics): Sep, 120

*QST* Branches Out...? (Nowakowski): Apr, 33

Radio Control Flyers' Net (Wilson): Jun, 97

RF Transport (Davis): Jan, 89

Roll Your Own Ham Call Sign Database (Hardy): Aug, 91

Scout Elmer Award: Nov, 80

Semper Paratus (Coast Guard Club) (Gardner): Jan, 89

Solicitations for Nominations for Golden Antenna Award (Stadt Bad Bentheim): May, 96

Some Interesting Ham Trivia: Mar, 96

Telling Others About Ham Radio (Myers): Jun, 103

Ten Ten Convention (Henderson): Feb, 49

Twins K1EIC and K1EIR: Sep, 94

Two-Letter USPS Codes for US States (Gould-King): Feb, 92

Unintentional Humor in the News (Bushnell): Sep, 97

W1DRX, the Grandfather, and W1DRX, the Grandson (Clements): Jul, 94

Which Herbert L. Bigelow? (Scheinberg): Aug, 91

Wilderness VHF Protocol: Aug, 79

Worked All Parish Award (Gordon): Jan, 89

Working Alaska, Then and Now (Webb): Jun, 103

#### TECHNICAL CORRESPONDENCE—Column (Page)

450-ohm Open-Wire-Line Velocity Factor: Not Always What You Think! (Witmer): Jan, 83

Amateur Radio Software Traps (Galpin): Aug, 69

Another Source of RFI (Witmer): Jan, 84

Answering-Machine QRM (Kolb): Jan, 84

Balloon Skyhooks (Hughes): Aug, 69

Check the Calibration of Your Maxwell Bridge with an Inductance Simulator (Stanley): Mar, 80

Checking Power Strips (Mandelkern): Sep, 82

Choke the OCFD (Gaudier): Sep, 82

Chrysler Responds (Gilmore): Dec, 72

Complex Transmission Line Characteristic Impedance - How Important is it? (Michaels): Nov, 70

Diode "Protection" (Stuart): Jul, 68

Diode Protection - Another Aspect (Metzger): Oct, 82

Easy Antenna Layout (Gibson): Oct, 82

Headset Mikes and RF Feedback in the Kenwood TS-850 (Savage): Apr, 70

Headset-Microphone Feedback (Fechter): Sep, 82

LM324 Trick, An (Helm): Jan, 84

Mathcad 6.0 versus Excel V 5.0 and Complex Numbers (Blanchard): Jan, 83

Mathcad 6.0 versus Lotus 1-2-3 (Laroche): Jan, 83

Mathematics Laboratory, A (Nordquest): Jan, 83

Modifying The "Slant-Wire Special" for More Gain (Christman): May, 74

New(?) Serial Communication Protocol Discovered..., A (Ulbing): Apr, 70

RE-Exploring HF/VHF Digital and Image Modes on the Cheap (Mayhan): Apr, 69

RF Chokes Choke Touch-Lamp RFI (Davis): May, 74

RFI TV Damage (Phillips): Oct, 83

Signal Envelope Elimination and Restoration (Freedman): Oct, 82

Stratwarms and Their Effect on HF Propagation (Luetzelschwab): Feb, 76

SWR Analyzer and Transmission Lines, The (Schuch): Jul, 68

Ultra Simple W1AW Receiver Notes (Kitchin): Nov, 70

Which Solar Activity Measurement Should I Use (Luetzelschwab): Dec, 71

#### VHF/UHF AND MICROWAVES

Catch a Falling Star (Kleinschmidt): Oct, 63

Height Really Does Matter! (Lehman): Aug, 52

Junk-Box Converters for 6 and 2 Meters (Kreuter): Jan, 32

Probing the Ionosphere with Radio Signals (sidebar to Sporadic E—A Mystery Solved? Part 2) (Whitehead): Nov, 40

Sporadic E—A Mystery Solved? (Whitehead): Oct, 39

Sporadic E—A Mystery Solved? Part 2 (Whitehead): Nov, 38

Tallyho 6 Meters! (Ford): Jun, 64

Ultra Simple: Receiver for 6 Meters, An (Kitchin): Dec, 39

Wire Gain Antennas for 6 Meters (Witmer): Feb, 66

#### VHF/UHF Century Club Awards (Moore):

Feb, 97; Apr, 89; Jun, 92; Aug, 86; Oct, 101; Dec, 89

#### World Above 50 MHz, The—Column (Pocock)

144-MHz Standings: Jun, 91

432-MHz Standings: Oct, 100

Beacon Update: Jul, 89

Call Sign Changes: Mar, 91

Coming Meteor Storm, The: Oct, 98

Dual Rhomboid Revisited, The: Mar, 89

EME Annals: Mar, 91

Get on 448 THz for Less Than \$100: Feb, 96

Is 10 Meters a VHF Band?: Nov, 85

Microwave Standings: Jan, 99

Mini-Brendan Trophy (VHF/UHF/Microwave News): Jan, 98

Model Two-Meter Sporadic-E Opening: Sep, 91

New Laser Record: Dec, 87

New Microwave DX Record (VHF/UHF/Microwave News): Oct, 100

Record Distance Calculation: Apr, 87

Season for Six Meters, The: May, 88

Single-Yagi to Single-Yagi EME QSO: Dec, 87

Six Meters in Libya: Dec, 87

Solar Cycle 23 Progress: Dec, 86

Two-Meter Beacons from French Polynesia: Dec, 87

Two-Meter Challenges: Jun, 90

VHF and UHF Nets: Aug, 84

VHF/UHF Nets: Oct, 101

VHF/UHF/EME Conferences: Jan, 97

#### WASHINGTON MAILBOX—Column (Hennessee)

Communications with Non-Amateurs: Another Side of Amateur Radio: Sep, 96

Introducing... The Regulatory Information Bureau Web Page!: Dec, 92

Part 97: Keeping Pace in Our Changing World: Jun, 99

Talking to the Town: A Zoning Ordinance Primer (Hopengarten): Mar, 87

#### YL NEWS—Column (Dunn/Ortiz)

Adios, Amigos—33 and 73!: Jun, 100

iHola Amigos!: Oct, 105

Taking the Lead in Public Service: Feb, 95

Teaching the "Technically Challenged": Apr, 92

Thirty Years of CLARA: Dec, 95

Edited by Steve Ewald, WV1X • Assistant Field Services Manager

## The ARRL Field Organization Forum

### Field Organization Abbreviations

ACC	Affiliated Club Coordinator
ARES	Amateur Radio Emergency Service
ASM	Assistant Section Manager
BM	Bulletin Manager
BPL	Brass Pounders League
DEC	District Emergency Coordinator
DXFR	DX Field Representative
EC	Emergency Coordinator
LGL	Local Government Liaison
NCS	Net Control Station
NM	Net Manager
NTS	National Traffic System
OBS	Official Bulletin Station
OES	Official Emergency Station
ORS	Official Relay Station
OO	Official Observer
OOC	Official Observer Coordinator
PBBS	Packet Bulletin Board Station
PIC	Public Information Coordinator
PIO	Public Information Officer
PSHR	Public Service Honor Roll
SGL	State Government Liaison
SEC	Section Emergency Coordinator
SM	Section Manager
STM	Section Traffic Manager
TCC	Transcontinental Corps
TA	Technical Advisor
TC	Technical Coordinator
TS	Technical Specialist
VC	Volunteer Counsel
VCE	Volunteer Consulting Engineer
VE	Volunteer Examiner

### ATLANTIC DIVISION

**DELAWARE:** SM, Randall Carlson, WB0JJX, e-mail: WB0JJX@ARRL.ORG—Late September and early October appear to be public service months in Delaware with a variety of walks, exercises and drills taking place using Amateur Radio for communications. Many thanks to those who helped out all across the section providing this very vital service. On October 8, Amateur Radio participated in the annual Radiological Emergency Plan drill held by the Delaware Emergency Management Agency. This was the first event held at the temporary EOC building. All the amateur equipment worked well. We do have some adapting to do because of the change of location, but that's what keeps it interesting. A new EOC building is currently under construction in the Smyrna area. The Delaware section now has a home page. Its URL is <http://geographics.com/Staff/RANDALL/Seccpage.htm>. The site is still changing somewhat. The company providing the webhosting is a bit new in the game, and we both are on a learning curve, so please be patient if you run into any quirks with the site. Traffic (Sept): DTN QNI 91 QTC 22 in 22 sess. DEPN QNI 19 QTC 0 in 4 sess, SEN QNI 56 QTC 4 in 4 sess. K3JL 34 WB0JJX 4.7, Randall.

**EASTERN PENNSYLVANIA:** SM, Allen R. Breiner, W3TI—SEC: WB3FPL, STM: W3KOD. SGL: W3BKF. BM: WA3PZ0. ACC: N3IGA. OOC: W3DZ1. PIC: WA3DCL. TC: K3DS. ASM: WY3K. ASM: K3TX. ASM: W3ZXV. ASM: N3KY2. Welcome to the newest appointments to our Section Field Services: OES to K3KSA, N3XPB, K16NJ, N3TDL, AA3C, WB3FQY, N3AT, N3PFF. TS to K3KSA, AA3C, PIO to WB3FQY, K16NJ, N3OFZ. LGL to WB3FQY, K16NJ, N3OFZ. W3UAQ was installed as Lieutenant Governor for the Pennsylvania State Kiwanis. He is also celebrating 10 years of broadcasting at station WNB1, Welsboro. N3AO spent some time canoe camping in the Adirondacks. Mr N3ORH and Mrs N3TJF moved to a new QTH. K3KFD was a visitor to VK-land. W3ZQN became granddad again. Communications were supplied at the Tioga County Early Days Fair by A3HI, N3BWB, N3HSY, N3OTO, W3BKF and W3QBZ. Congrats to the new up-grades: N3ZCT to General and N3YCY made it to the big "X." AA3LQ is a new addition to the DXCC list. Dr. Jeff, KB3EV, has been elected secretary of the New Jersey Academy of Family Physicians. For Novice-Tech classes in the Del-Lehi ARC, contact NU3L. Amateur class instruction in the OMKI Electronic Communications Assn. are being taught by AA3NV, K3VB, W3LVQ and held at the Chrissy Recreation Center. RAIN has come to the Marple Newtown ARC in the form of the Radio Amateur Information Net, held on 442.250 MHz. EC WA3FQY lists more than 40 dedicated ARES/RACES

volunteers in Lancaster county who have been very active in the TMI and Peach Bottom exercises. The following ECs participated in the annual county ARES evaluation: KF2PM Bucks, KC3XL Chester, KA3PDQ Dauphin, WB3FQY Lancaster, WA3LWR Lackawanna, N3NUV Lycoming, KA3KMH Luzern, N3IRN Montour, W3SJ Monroe, W3EAG Montgomery, W3PYF Northampton, NR3U Snyder, WY3K Schuylkill, K3BM Montgomery, KA3TOV Wyoming, N3GKP York. From 59% of the counties reporting there are 70 OES appointments and 744 active ARES members. 12 hold a Simulated Emergency Test. 8 have their own county ARES traffic net. 4 have NTS liaison and 11 sponsor ARES training sessions. Our thanks to those ECs who took time to send us that information. Our State Government Liaison, W3BKF, is in the process of getting legislation passed that would get free vehicle registration available for ARES/RACES groups who own emergency communications vans, mobiles, trailers etc. If your club or emergency group is interested send us some details about your vehicle and equipment. Best wishes for a happy holiday season from the Section Cabinet members WB3FPL, W3KOD, W3DZI, WA3PZO, W3BKF, N3IGA, WY3K, K3TX, W3ZXV, N3KY2 and SM, W3TI. TIC: W3KOD 504, N3DRM 274, N3EFW 162, W3HK 145, W3NTH 107, W3VIS 85, NR9K 67, W3IPX 49, WA3EHD 42, N3NHN 34, AD3X 34, W3DP 32, N3HR 28, N3AT 24, WY3K 22, W3NHL 21, W3KAG 20, W3JKX 19, N3CSE 17, W3TI 17, K3TX 16, W3ZQN 16, W3ADE 10, W3TW 10, N3AS 8, K3ARR 7, N3DCG 6, KA3LVP 6, WA3CKA 5, W3BNH 4, W8SD 3, WB3GCK 2. TIC Nets: EPA 214, EPAET 155, PTTN 107, PFN 10, D6ARES 13, SCSN 12, EPAS 6, LCARES 5, SEPTN 4, CCRAN 4. With the end of the year drawing near, give some thought to sending your holiday greetings via our section traffic nets. An ARL-Sixty One of Sixty Two sent to friend and relatives would be greatly appreciated by them, plus it would boost your traffic count. Here's wishing all a Joyous and Happy Holiday season. Harry, W3KOD, STM.

**MARYLAND/DC:** SM: Bill Howard, WB3V, 410-551-6775 (wb3v@erols.com)—ACC: Tony Young, WA3YLO 301-262-1917. ASM: Jerry Gavin, NU3D, 410-761-1423 (k2ilq@aol.com). ASM/RACES Coord: Al Nollmeyer, W3YVQ. BM: Al Brown, WA3FYZ, 301-490-3188 (Al\_Brown@ix.netcom.com). SEC: Mike Carr, WA1QAA, (bamcc@erols.com). N3CZ: Mike Carr, WA1QAA, (bamcc@erols.com). N3EFW: Bruce Fleming, N3EGF @ K3HKL, 301-863-6582 (MEGASWOOP@erols.com). TC: Bob Bruninga, WB4APR 410-553-6021 (bruninga@greatlakes.nadn.navy.mil). MDC section Web homepage [www.erols.com/wb3v/mdc/](http://www.erols.com/wb3v/mdc/). Please visit the MDC home page for all the latest links, information and more nets! This certainly has been an interesting month. While we are all getting ready for holiday festivities, there is one issue on which I would like your comments. It is a very common practice for clubs to invite speakers to liven up their meetings. Recently, a couple of our MDC Section volunteers were invited to attend a club meeting, during which they were handled very abusively by some of the attendees. The incident seemed to be very embarrassing for a number of the club members. My question is, what do you think of this type of situation and how do you believe it should be handled during the meeting? PRGE EC KA3PVS for July reported 35 members, 2 net sessions on 145.35 with liaison to BTN, and participation in CAM by ARES members N3KHK, KA3PVS, KA3PVM, W3YD, and Tom Wolff. Vikki reports for August: 36 members, an increase of 1; 2 net sessions on 145.35 with liaison to BTN, and ARES participation in Cycle the BAY for MS. Participants in this Public Service Event, providing emergency communications, were John Hueber, Dave Gossard, Hugh Katz, and Vikki GARR EC N3KAT reports 12 members. MONT EC K3XO reports that on Saturday September 13, MONT amateurs provided communications for the 6th annual Poolevilles Day Bike Ride for Breast Cancer Research. 80 cyclists participated in the 25 mile ride. Communications were provided at the start/finish line, a rest stop and from one SAG wagon. In addition, two mobile units patrolled the course; no injuries were reported. Participating amateurs were N4EOD, N3SHA, WA3WOD, KE3UJM, and K3XO. STMA EC N3RVX reports 24 members; 4 nets (with a total of 31 check ins). 73 - Bill, with the nets. Net/Net Mgr/QND/QTC/QNI: MNS/KC3Y/30/49/22, MEPN/K3OZO/30/93/602, MDD/W3JK/53/114/250, MDD Top Brass K3JE 162, N3DE 137, W3YVO 124, BTN A3ALN 30/41/404, SMN/K3OZO/3/6/25, Aug MDD/W3JK/52/131/238, Aug MDD Top Brass W3YVO 158, K3JE 144, K3KF 121. TIC: KK3F 235, N3DE 205, K3JE 148, W3YVO 107, KG6TU 83, K3C3Y 72, K3USO 61, KE3OX 47, W3JK 45, KE3FL 33, N3WK 27, WA1QAA 18, N3EGF 13, N3RVX 17, N3WKE 12, WA3GYW 5, Aug N3WKE 27. PSHR: KK3F 160, W3YVO 148, KG6TU 138, KE3OX 129, K3JE 128, K3CY 122, KE3FL 110, N3RVX 100, N3WK/92, WA1QAA 87, N3WKE 84, Aug N3WKE 91.

**SOUTHERN NEW JERSEY:** SM, Jean Priestley, KA2YKN (@K2AA) e-mail: ka2ykn@mosquito.com—ASM: W2BE, K2WB, W2OB, N2OO. SEC: W2HOB STM: WB2UVB. ACC: K2B2DL. TC: W2EKB. SGL: KB2WKY. BM: KB2GNB. OOC: N2E. PIC/PIO: NY2AJA. TS: W2PAU, W2BE, AB2Y, K2JF, WB2MNF, KDH4HZW. Spratly Island, a dream come true. Bob, N2OO, and Beth Schenck return to Spratly Island. The first trip wasn't completed so when good friend,

Alfons, 9M6MU, asked for help, a special event in Hillview gardens in Sabah, East Malaysia, off they went. Using 9M6HIL, efforts netted 5500 QSOs. While in the area, they operated in St Croix, the IOTA contest which yielded 1600 QSOs and 1000 QSOs outside of the contest. Efforts under 9M6OO, from Spratly Island (Layang-Layang Island) produced 10,000 QSOs. Congrats to Bob and crew, super job. What are you going to do now, Bob? In Burlington County on Sept. 27/28, joint ARES/RACES supplied communications and coordination for the South Jersey Regional Airport Air Victory Museum annual airshow. This was a first time venue for BCAR. It will be an annual ARES/RACES activity. Burlington County ARES/RACES also participated in a Hazmat drill at the Viking Yacht on Bass River. In August, Old Barney ARC had a successful special event at Barnegat Lighthouse with 600 QSOs & many visitors. Congratulations. WB2UVB 215, WA2CUW 134, K2UL 119, AA2SV 102, W2HOB-4 32, KB2YZ 24, KB2V 119, K2UL-4 14, KA2CQX 12, N2WFN 12, N2FET 10, KB2CDB 7, W2AZ 6, N2FHJ 4, KB2VSR KB2YBM N2FHK N2SOE KB2HJJ.

**WESTERN NEW YORK:** SM, William Thompson, W2MTA —Club Officers: GRAM KB2UQZ KB2LXD KB2ZFH 92VTN; KLARA N2FVI WA2HDE KV2W N2VEB; Liverpool N2UQX KB2SWN WA2DAD N2TAI KB2SWB; PROS KB2DNL KB2SCN N2LBV N2IFG; RAGS N2TRR KB2UQQ W2YIK WA2URU WA2PUU; RAPS N2OYQ KB2WPT WB2BWQ; RAWNY WA2FKV KB2TJG KM2L KA2ORB. Club News: Congrats RAWNY on SSC renewal; Lancaster ARC, which was struck by up to 65KA of lightning, now has a Web Page—<http://hamgate1.sunyerie.edu/~larc>—thanks to PIO KG2IC. Humor has it WNYDXA has demoted WB2ABD and W2WVC for lack of owl juice (refer inquiries to REPORT editor KF2YF about KB2ABD and WB2WVC). Club Annual Reports are lagging: Allegany, Kodak Park, Lockport, Margaretville, Niagara, Orleans, Post 204, RAGS, RIT, RVHFG, Rome Squaw Island, Tioga, Tompkins, U of R, and Unatego. Checkout the ARRL Web Page <http://www.arrl.org/Folks>, it's a snap nowadays to file those club reports! Appointments: (LGL) KB2VLP; (OES) K2BWK KB2VLP KB2WII KC2AGS N2KZP N2ZZW0 WA2GUP; (OO) K2UCO; (PIO) KB2VLP KG2IC; (SGL) N2KYZ. HAMFESTS: Marathon January 10, Rochester May 29-31, Buffalo Sept. 19. Western District went heavy in public service these past two months supporting 700 bikers in the MS Bike Trek and by supporting Amateur Radio Demonstrations at the Erie County Fair and Exposition, thanks to efforts of K2O0, STARs and the many operators in the Western District. DATALINK: K2DN R 31/88, KA2GJV R58/S35, N2LTC R165/S199 NY2V R10/S0, W4BNY R5/S0, K2O0: AA2CX N2LTC.

Net Name QNI OSP OND Net Name QNI OSP OND  
Early Bird 371 000 21 #STAR-FM 339 033 30  
NYS RACES 070 008 04 #WDN-E-FM 354 063 30  
NYS-CW 018 004 04 #NYS-E-CW 3166 177 30  
#NYS-CW 196 103 30 OMEN ARES 021 001 02  
WEST-FM/SSB 724 1176 13 Oneonta ARC 030 004 04  
Clearing House 211 038 27 TIGARDS-FM 032 004 04  
#WDM-FM 345 063 30 BRVSN-FM 265 009 30  
#NY Phone 322 320 30 #CNYT-FM 330 031 30  
#NYPN-SSB 307 223 30 #OCETN/L-FM 533 198 30  
ESS-CW 3590 334 141 30 #WDLN/L-FM 354 064 30  
NYSPT&EN 384 044 30 VHF THIN-FM 014 000 01  
#OCTEN/E 1129 166 30  
(#NTS nets: \* Public Service Honor Roll) Traffic (Sept.): N2LTC-1004, AA2CX-591, KA2ZNZ-422, KA2GJV-346, W2MTA-333, K2B2L-305, KF1L-237, WI2G-221, WB2JH-207, NY2V-162, WB2QX-154, AF2K-132, K2YAI-130, KB2TJ-116, KB2UQF-116, KG2D-94, AA2ED-82, KB2KOJ-71, W4BNY-65, NN2H-57, K2DN-54, KC2AGS-47, N2JRS-45, N2CNCN-34, N2OJ-29, KA2D2B-27, W2PIL-22, KB2UQZ-18, KB2ETO-16, KA2QIK-11, N8JSO-9, KB2SCF-7. Seasons Greetings 73 to all. w2mta@juno.com.

**WESTERN PENNSYLVANIA:** SM, Bill Edgar, N3LRL—ASM: N3MSE. ASM-ARES/SEC: WB3KGT. ASM-Packet: KE3ED. STM: WB2KPE. TC/OOC: WR4W. BM: KC3ET. ACC: AK3J. PIC: W3CG. DEC-N1: N3YHP. DEC-N2: KD3OH. DEC-S1 & S2: N2PHF. 1997 is just about over and the new year is almost upon us. I'd like to ask a favor from each amateur operator in Western Pennsylvania. Please share this hobby with one other person in the coming year and invite them to join in. Could you imagine the number of amateur operators doubling in our section? The benefits would be numerous: more people to communicate with; more people to learn CW; more people to participate in club events; more people to participate in Field Day chores; and more people to meet and become friends with. Can I also stretch my request to ask you to also invite them to your club meetings and get them ACTIVE with club events? Our clubs need new members and if we don't invite new people to come to our meetings, they won't come. Very often, when we introduce the hobby to another person, we get all excited about the hobby ourselves. The same is true for clubs. If we share our club activities with new people, we

Continued on page 126.

**ANAHEIM, CA**  
(Near Disneyland)  
933 N. Euclid St., 92801  
(714) 533-7373  
**(800) 854-6046**  
Janet, WØMF, Mgr.

**BURBANK, CA**  
2492 W. Victory Bl., 91506  
(818) 842-1786  
**(800) 854-6046**  
Eric, KA6IHT, Mgr.  
Victory Blvd. at Buena Vista  
1 mi. west I-5

**OAKLAND, CA**  
2210 Livingston St., 94606  
(510) 534-5757  
**(800) 854-6046**  
Mark, KE6OPF, Mgr.  
I-880 at 23rd Ave. ramp

**SAN DIEGO, CA**  
5375 Kearny Villa Rd., 92123  
(619) 560-4900  
**(800) 854-6046**  
Tom, KM6K, Mgr.  
Hwy. 163 & Claremont Mesa

**SUNNYVALE, CA**  
510 Lawrence Exp. #102  
94086  
(408) 736-9496  
**(800) 854-6046**  
Ken, K1ZKM, Mgr.  
[KDM@HAMRADIO.COM](mailto:KDM@HAMRADIO.COM)  
So. from Hwy. 101

**NEW CASTLE, DE**  
(Near Philadelphia)  
1509 N. Dupont Hwy., 19720  
(302) 322-7092  
**(800) 644-476**  
Chris, K1SI, Mgr.  
RT.13 1/4 mi., So. I-295

**PORTLAND, OR**  
11705 S.W. Pacific Hwy.  
97223  
(503) 598-0555  
**(800) 854-6046**  
Ray, K17TM, Mgr.  
Tigard-99W exit  
from Hwy. 5 & 217

**DENVER, CO**  
8400 E. Iliif Ave. #9, 80231  
(303) 745-7373  
**(800) 444-9476**  
Joe, KDØGA, Mgr.

**PHOENIX, AZ**  
1939 W. Dunlap Ave., 85021  
(602) 242-3515  
**(800) 444-9476**  
Gary, N7GJ, Mgr.  
1 mi. east of I-17

**ATLANTA, GA**  
6071 Buford Hwy., 30340  
(770) 263-0700  
**(800) 444-7927**  
Phil, N4DRO, Mgr.  
Doraville, 1 mi. no. of I-285

**WOODBRIDGE, VA**  
(Near Washington D.C.)  
14803 Build America Dr.  
22191  
(703) 643-1063  
**(800) 444-4799**  
Mike, KA3TMQ, Mgr.  
Exit 161, I-95, So. to US 1

**SALEM, NH**  
(Near Boston)  
224 N. Broadway, 03079  
(603) 898-3750  
**(800) 444-0047**  
Chuck, KM4NZ, Mgr.  
[CLW@HAMRADIO.COM](mailto:CLW@HAMRADIO.COM)  
Exit 1, I-93;  
28 mi. No. of Boston

# Special HRO Holiday Discounts Off Our Already Low Prices!



# HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION



**FT-840**

- 100W • 12V DC • DDS
- Gen. Cov. Rx, 100 mem.
- Optional Ext. Auto • Tuners Available

**Call Now For Our Low Pricing!**



**FT-1000MP** HF Transceiver

- Enhanced Digital Signal Processing
- Dual RX
- Collins SSB filter built-in
- 100W, Power supply built-in

**Call Now For Low Pricing!**



**FT-900CAT**

- Compact HF Trans., 100W, Collins Filter
- Optional built-in auto tuner
- Removable front panel, optional kit req.
- QSK, 100 Mem. Gen Cov. Rx,  
OMNI-Glow display

**Call Now For Low Price!**

AZ, CA, CO, GA.  
VA residents add  
sales tax. Prices,  
specifications  
descriptions,  
subject to change  
without notice.



Call For  
Possible Extensions

Coupon Expiration  
Dec. 31st



**FT-736R**

The Ultimate Oscar Machine  
VHF/UHF All Mode Transceiver  
25W, Built-In Power Supply



**FT-3000M**

- 2M 70W Mobile • Wide Band RX
- AM Aircraft RX • Dual Watch
- 9600 Baud Compatible • Alpha Numeric Display

**Call For Low Pricing!**



**FT-920** HF+6M Transceiver

- 100W 160-6M, 12VDC
- Built-in DVR, CW Memory Keyer
- DSP, Auto-Notch • 99 Memories
- Computer controllable, CAT System

**Call For Intro. Low Pricing!**



**FT-8100R** 2M/440 Mobile

- Ultra Compact • 50W/35W 2M/440
- 110 memories • Wide Band RX
- Backlit mic • Removable front panel w/optional YSK-8100

**Call Now For Special Pricing!**

Look for the  
HRO Home Page  
on the  
World Wide Web  
<http://www.hamradio.com>

## COAST TO COAST

### FREE SHIPPING

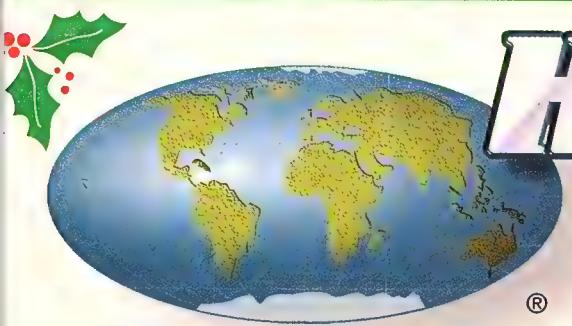
UPS - Most Items Over \$100

Rapid Deliveries From

The Store Nearest To You!



# Special HRO Holiday Discounts Off Our Already Low Prices!



# HAM RADIO OUTLET

**WORLDWIDE DISTRIBUTION**



## IC-756 All Mode Transceiver

- HF + 6 Meters
- 4.9 inch Multi-Function LCD
- Newly Designed DSP
- Twin PBT
- 5-100 variable-control watts of 100% stable output power (5-40 W on AM)
- PC Programmable (Optional CT-17 required)

**PC Ready!**



## IC-775DSP HF Transceiver

- 200 W (SSB, CW, RTTY, FM, AM)
- Tx/Rx DSP with Noise Reduction/Auto Notch
- Twin Passband Tuning
- Dual Watch
- Built-in Antenna Tuner



## IC-R8500 All Mode Transceiver

- IF-Shift and APF Functions
- Coverage 100 kHz to 1999.99 MHz†
- 1000 Memory Scans
- Selectable AGC Time Constant
- Built-in ICOM CI-V Computer Control Interface and RS-232C Port
- 3 Antenna Connectors

© 1997 ICOM America, Inc. AM-3683 9-97.  
The ICOM logo is a registered trademark of ICOM, Inc.

## CALL TOLL FREE

Phone: (800) 854-6046  
9:30 AM - 5:30 PM (EST)  
5:30 PM - 8:30 PM (EST)  
Fax: (714) 842-1786  
E-mail: [info@hamradio.com](mailto:info@hamradio.com)

West..... 800-854-6046  
Mountain.... 800-444-9476  
Southeast.... 800-444-7927  
Mid-Atlantic... 800-444-4799  
Northeast.... 800-644-4476  
New England... 800-444-0047

Look for the  
HRO Home Page  
on the  
World Wide Web  
<http://www.hamradio.com>

AZ, CA, CO, GA,  
VA residents add  
sales tax. Prices,  
specifications,  
descriptions,  
subject to change  
without notice.

**ANAHEIM, CA**  
(Near Disneyland)  
933 N. Euclid St., 92801  
(714) 533-7373  
**(800) 854-6046**  
Janet, WØMF, Mgr.

**BURBANK, CA**  
2492 W. Victory Bl., 91506  
(818) 842-1786  
**(800) 854-6046**  
Eric, KAGIHT, Mgr.  
Victory Blvd. at Buena Vista  
1 mi. west I-5

**OAKLAND, CA**  
2210 Livingston St., 94606  
(510) 534-5757  
**(800) 854-6046**  
Mark, KE6OFP, Mgr.  
I-880 at 23rd Ave. ramp

**SAN DIEGO, CA**  
5375 Kearny Villa Rd., 92123  
(619) 560-4900  
**(800) 854-6046**  
Tom, KM6K, Mgr.  
Hwy. 163 & Claremont Mesa

**SUNNYVALE, CA**  
510 Lawrence Exp. #102  
94086  
(408) 736-9496  
**(800) 854-6046**  
Ken, K1ZKM, Mgr.  
[KDM@HAMRADIO.COM](mailto:KDM@HAMRADIO.COM)  
So. from Hwy. 101

**NEW CASTLE, DE**  
(Near Philadelphia)  
1509 N. Dupont Hwy., 19720  
(302) 322-7092  
**(800) 644-4476**  
Chris, K1SI, Mgr.  
RT.13 1/4 mi., So. I-295

**PORTLAND, OR**  
11705 S.W. Pacific Hwy.  
97223  
(503) 598-0555  
**(800) 854-6046**  
Ray, K17TN, Mgr.  
Tigard-99W exit  
from Hwy. 5 & 217

**DENVER, CO**  
8400 E. Iliff Ave. #9, 80231  
(303) 745-7373  
**(800) 444-9476**  
Joe, KD0GA, Mgr.

**PHOENIX, AZ**  
1939 W. Dunlap Ave., 85021  
(602) 242-3515  
**(800) 444-9476**  
Gary, N7GJ, Mgr.  
1 mi. east of I-17

**ATLANTA, GA**  
6071 Buford Hwy., 30340  
(770) 263-0700  
**(800) 444-7927**  
Phil, N4DRO, Mgr.  
Doraville, 1 mi. no. of I-285

**WOODBRIDGE, VA**  
(Near Washington D.C.)  
14803 Build America Dr.  
22191  
(703) 643-1063  
**(800) 444-4799**  
Mike, KA3TMQ, Mgr.  
Exit 161, I-95, So. to US 1

**SALEM, NH**  
(Near Boston)  
224 N. Broadway, 03079  
(603) 898-3750  
**(800) 444-0047**  
Chuck, KM4NZ, Mgr.  
[CLW@HAMRADIO.COM](mailto:CLW@HAMRADIO.COM)  
Exit 1, I-93;  
28 mi. No. of Boston

**ANAHEIM, CA**  
(Near Disneyland)  
933 N. Euclid St., 92801  
(714) 533-7373  
**(800) 854-6046**  
Janet, WØMF, Mgr.

**BURBANK, CA**  
2492 W. Victory Bl., 91506  
(818) 842-1786  
**(800) 854-6046**  
Eric, KA6IHT, Mgr.  
Victory Blvd. at Buena Vista  
1 mi. west I-5

**OAKLAND, CA**  
2210 Livingston St., 94606  
(510) 534-5757  
**(800) 854-6046**  
Mark, KE6OP, Mgr.  
I-880 at 23rd Ave. ramp

**SAN DIEGO, CA**  
5375 Kearny Villa Rd., 92123  
(619) 560-4900  
**(800) 854-6046**  
Tom, KM6K, Mgr.  
Hwy. 163 & Claremont Mesa

**SUNNYVALE, CA**  
510 Lawrence Exp. #102  
94086  
(408) 736-9496  
**(800) 854-6046**  
Ken, K1ZKM, Mgr.  
[KDM@HAMRADIO.COM](mailto:KDM@HAMRADIO.COM)  
So. from Hwy. 101

**NEW CASTLE, DE**  
(Near Philadelphia)  
1509 N. Dupont Hwy., 19720  
(302) 322-7092  
**(800) 644-4476**  
Chris, K1SI, Mgr.  
RT.13 1/4 mi., So. I-295

**PORTLAND, OR**  
11705 S.W. Pacific Hwy.  
97223  
(503) 598-0555  
**(800) 854-6046**  
Ray, K17TN, Mgr.  
Tigard-99W exit  
from Hwy. 5 & 217

**DENVER, CO**  
8400 E. Iliff Ave. #9, 80231  
(303) 745-7373  
**(800) 444-9476**  
Joe, KDØGA, Mgr.

**PHOENIX, AZ**  
1939 W. Dunlap Ave., 85021  
(602) 242-3515  
**(800) 444-9476**  
Gary, N7GJ, Mgr.  
1 mi. east of I-17

**ATLANTA, GA**  
6071 Buford Hwy., 30340  
(770) 263-0700  
**(800) 444-7927**  
Phil, N4DRO, Mgr.  
Doraville, 1 mi. no. of I-285

**WOODBRIDGE, VA**  
(Near Washington D.C.)  
14803 Build America Dr.  
22191  
(703) 643-1063  
**(800) 444-4799**  
Mike, KA3TMQ, Mgr.  
Exit 161, I-95, So. to US 1

**SALEM, NH**  
(Near Boston)  
224 N. Broadway, 03079  
(603) 898-3750  
**(800) 444-0047**  
Chuck, KM4NZ, Mgr.  
[CLWV@HAMRADIO.COM](mailto:CLWV@HAMRADIO.COM)  
Exit 1, I-93;  
28 mi. N. of Boston

# Special HRO Holiday Discounts Off Our Already Low Prices!



# HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION



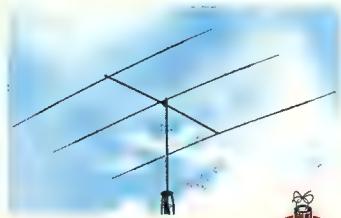
**cushcraft**



### R-7000

- 10-40M
- 7 band antenna
- 80M optional (R80 Kit)
- 24' tall, 32' w/R80
- Heavy duty construction

REG. \$510.00  
**SALE \$379.95**



### A3S 10, 15, 20 METERS

DX that stands out from the crowd. With stainless steel hardware. Whether busting pile-ups, rag chewing or hunting rare DX, the A3S stands out from the crowd with the perfect combination of easy assembly, the right size, rugged durability and great performance.

Boom Length 14 ft. • Weight 27 lbs.  
Wind Surface Area - 4.36 ft.

REG. \$445. **SALE \$329.95**



**STANDARD**



### C5900DA Tri-Band Mobile

- 6m, 2m, 440mHz Compact Mobile
- 1200-9600 Baud Packet Ready
- 45w 6m, 50w 2m, 35w 440mHz
- 80 Memories (each side); expandable to 200!
- CTSS Built-in • Remotable w/optional kit

**Call Now For Your Low Price!**



### C156A

2M Slimline

- 2M TX, 3 power levels
- Clear Dot-Matrix Display
- Alpha-Numeric
- 100 Mems, 9 DTMF Mems
- CTCSS Built-in
- "AA" Battery Pack

**Call Now For Your Low Price!**



### A3WS New 12 & 17 Meters Duo-Bander

Enjoy 12 & 17 meter bands with full performance beam. Easy-to-use kit adds 30 meters. Mount on lightweight tower/rotator or use with existing tri-band. A3WS has all aluminum construction w/stainless hardware.

Boom Length: 14 feet • Weight: 22 lbs.  
Turning Radius: 14.4 ft. • Wind Area: 4.1 sq.ft.

REG. \$360. **SALE \$279.95**



### C510A

Now In Stock!



**Call Now For Your Low Price!**

"FREE" CMP-115 Speaker/mic  
(from Standard) w/purchase of C108,  
C188, &C558A. Good thru Dec. 31, 97



### CG-270AS

New 2M/440 Mobile Antenna

Extra Rugged Construction; 90's styling; Easy Touch™ tilt feature; gold plated RF contact; large diameter radiator; black powder coated; water sealed; shock resistant. Exclusive 5 year Cushcraft Gold warranty.

Length 38"; use with mag. mount CSMG or C5TL trunk lip mount  
REG. \$99.95 **SALE \$89.95**

AZ, CA, CO, GA.  
VA residents add  
sales tax. Prices,  
specifications  
descriptions,  
subject to change  
without notice.

Look for the  
HRO Home Page  
on the  
World Wide Web  
<http://www.hamradio.com>

**COAST TO COAST  
FREE SHIPPING**  
UPS - Most Items Over \$100  
Rapid Deliveries From  
The Store Nearest To You!



# Special HRO Holiday Discounts Off Our Already Low Prices!



# HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

## KANTRONICS

\$10  
HRO  
Coupon

True Dual Port Simultaneous HF/VHF Operation

## KAM PLUS

**NEW** KAM Plus features 128K RAM, EPROM space for 1 MB, on-board clock, expanded personal mailbox and Pactor! And G-TOR! Operating modes include CW/RTTY/ASCII AMTOR/PACKET/PACTOR/WEFAX Terminal programs available for PC, Commodore and Macintosh computers.

**Call For Our Special Price!**

\$10  
HRO  
Coupon

KPC-9612  
9600 Baud  
Ready

## KPC-3 Plus/KPC-9612 Plus

A high-performance, low power TNC, for new and experienced users. Features dual level command set with 23 and 130 commands, respectively. Battery backed 128K RAM expandable to 512K. PBBS includes two-way forwarding, message header editing, remote sysop access and KA-NODE.

**Call For Special Low Price!**

\$10  
HRO  
Coupon

## MFJ

**Call now for all MFJ products...**

Wattmeters, dummy loads, coax switches, keyers, clocks, speaker and mics, software, books and more!



### MFJ-1278 B

All 9 digital modes  
Easy Mail™ Personal Mailbox  
20 LED Precision Tuning Indicator  
Includes free power supply

**One Year Unconditional Guarantee**

\$10  
HRO  
Coupon



### MFJ-949 E 300 Watt Tuner

Built-in dummy load  
New peak and Average Lighted  
2-color Cross-Needle SWR/Wattmeter  
Built-in antenna switch, balun  
Covers 1.8-30 MHz

**All MFJ Packets Stocked!**

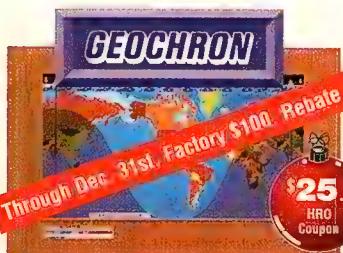
\$10  
HRO  
Coupon

## GEOCHRON

Through Dec 31st. Factory \$100 Rebate

\$25  
HRO  
Coupon

**Call For Special Low Price!**



Detailed illuminated map shows time, time zone, sun position and day of the week at a glance for any place in the world. Continuously moving - areas of day and night change as you watch. Mounts easily on wall. Size: 34 1/2" x 22 1/2".

Reg \$1295. **SALE \$999.95**

## rconcepts



### VHF/UHF Solid State Amplifiers

Contemporary design, quality and a 1 year warranty on parts and labor. 1 year on the RF Final transistors. Most amplifiers have GaAsFET receive pre-amps and high SWR shutdown protection

\$25  
HRO  
Coupon

\$25  
HRO  
Coupon

## CALL TOLL FREE

Phone Hours: 9:30 AM - 10:00 PM - 5:30 PM  
Store Hours: Closed Sun.

Toll free, incl. Hawaii, Alaska, Canada, call routed to nearest store; all HRO 800-lines can accept you. If the first line you call is busy, you may call another.

West.....800-854-6045  
Mountain.....800-444-9476  
Southeast.....800-444-7927  
Mid-Atlantic.....800-444-4799  
Northeast.....800-644-4476  
New England.....800-444-0047

Look for the  
HRO Home Page  
on the  
World Wide Web  
<http://www.hamradio.com>

AZ GA CO. IA  
VA residents add  
sales tax. Prices,  
specifications,  
descriptions  
subject to change  
without notice.

## ANAHEIM, CA

(Near Disneyland)  
933 N. Euclid St., 92801  
(714) 533-7373  
(800) 854-6046  
Janet, WØMF, Mgr.

## BURBANK, CA

2492 W. Victory Bl., 91506  
(818) 842-1786  
(800) 854-6046  
Eric, KA6IHT, Mgr.  
Victory Blvd. at Buena Vista  
1 mi. west I-5

## OAKLAND, CA

2210 Livingston St., 94606  
(510) 534-5757  
(800) 854-6046  
Mark, KE6OPP, Mgr.  
I-880 at 23rd Ave. ramp

## SAN DIEGO, CA

5375 Kearny Villa Rd., 92123  
(619) 560-4900  
(800) 854-6046  
Tom, KM6K, Mgr.  
Hwy. 163 & Claremont Mesa

## SUNNYVALE, CA

510 Lawrence Exp. #102  
94086  
(408) 736-9496  
(800) 854-6046  
Ken, K1ZKM, Mgr.  
KDM@HAMRADIO.COM  
So. from Hwy. 101

## NEW CASTLE, DE

(Near Philadelphia)  
1509 N. DuPont Hwy., 19720  
(302) 322-7092  
(800) 644-4476  
Chris, K1SI, Mgr.  
RT.13 1/4 mi., So. I-295

## PORTLAND, OR

11705 S.W. Pacific Hwy.  
97223  
(503) 598-0555  
(800) 854-6046  
Ray, K17TN, Mgr.  
Tigard-99W exit  
from Hwy. 5 & 217

## DENVER, CO

8400 E. Iliiff Ave. #9, 80231  
(303) 745-7373  
(800) 444-9476  
Joe, KD0GA, Mgr.

## PHOENIX, AZ

1939 W. Dunlap Ave., 85021  
(602) 242-3515  
(800) 444-9476  
Gary, N7GJ, Mgr.  
1 mi. east of I-17

## ATLANTA, GA

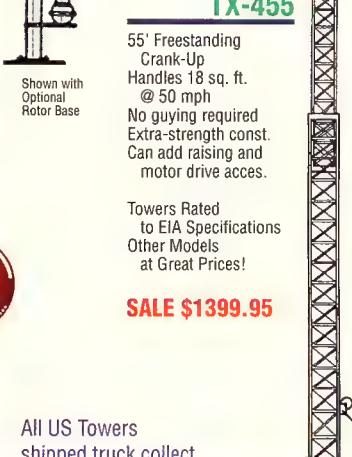
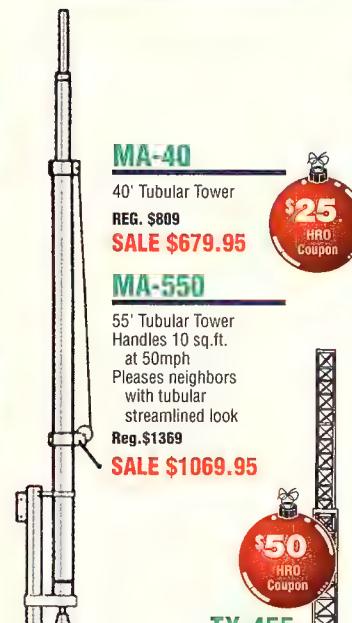
6071 Buford Hwy., 30340  
(770) 263-0700  
(800) 444-9472  
Phil, N4DRO, Mgr.  
Doraville, 1 mi. no. of I-285

## WOODBRIDGE, VA

(Near Washington D.C.)  
14803 Build America Dr.  
22191  
(703) 643-1063  
(800) 444-4799  
Mike, KA3TMQ, Mgr.  
Exit 161, I-95, So. to US 1

## SALEM, NH

(Near Boston)  
224 N. Broadway, 03079  
(603) 898-3750  
(800) 444-0047  
Chuck, KM4NZ, Mgr.  
CLW@HAMRADIO.COM  
Exit 1, I-93;  
28 mi. No. of Boston



All US Towers  
shipped truck collect.

**ANAHEIM, CA**  
(Near Disneyland)  
933 N. Euclid St., 92801  
(714) 533-7373  
**(800) 854-6046**  
Janet, WØMF, Mgr.

**BURBANK, CA**  
2492 W. Victory Bl., 91506  
(818) 842-1786  
**(800) 854-6046**  
Eric, KA6IHT, Mgr.  
Victory Blvd. at Buena Vista  
1 mi. west I-5

**OAKLAND, CA**  
2210 Livingston St., 94606  
(510) 534-5757  
**(800) 854-6046**  
Mark, KE6OPP, Mgr.  
I-880 at 23rd Ave. ramp

**SAN DIEGO, CA**  
5375 Kearny Villa Rd., 92123  
(619) 560-4900  
**(800) 854-6046**  
Tom, KM6K, Mgr.  
Hwy. 163 & Claremont Mesa

**SUNNYVALE, CA**  
510 Lawrence Exp. #102  
94086  
(408) 736-9496  
**(800) 854-6046**  
Ken, K1ZKM, Mgr.  
KDM@HAMRADIO.COM  
So. from Hwy. 101

**NEW CASTLE, DE**  
(Near Philadelphia)  
1509 N. Dupont Hwy., 19720  
(302) 322-7092  
**(800) 644-4476**  
Chris, K1SI, Mgr.  
RT.13 1/4 mi., So. I-295

**PORTLAND, OR**  
11705 S.W. Pacific Hwy.  
97223  
(503) 598-0555  
**(800) 854-6046**  
Ray, K17TN, Mgr.  
Tigard-99W exit  
from Hwy. 5 & 217

**DENVER, CO**  
8400 E. Iliff Ave. #9, 80231  
(303) 745-7373  
**(800) 444-9476**  
Joe, KD0GA, Mgr.

**PHOENIX, AZ**  
1939 W. Dunlap Ave., 85021  
(602) 242-3515  
**(800) 444-9476**  
Gary, N7GJ, Mgr.  
1 mi. east of I-17

**ATLANTA, GA**  
6071 Buford Hwy., 30340  
(770) 263-0700  
**(800) 444-7927**  
Phil, N4DRO, Mgr.  
Doraville, 1 mi. no. of I-285

**WOODBRIDGE, VA**  
(Near Washington-D.C.)  
14803 Build America Dr.  
22191  
(703) 643-1063  
**(800) 444-4799**  
Mike, KA3TMQ, Mgr.  
Exit 161, I-95, So. to US 1

**SALEM, NH**  
(Near Boston)  
224 N. Broadway, 03079  
(603) 889-3750  
**(800) 444-0047**  
Chuck, KM4NZ, Mgr.  
CLW@HAMRADIO.COM  
Exit 1, I-93;  
28 mi. No. of Boston

# Special HRO Holiday Discounts Off Our Already Low Prices!



# HAM RADIO OUTLET

WORLDWIDE DISTRIBUTION

Instant  
Coupons  
Now Through  
12/31/97!

**KENWOOD**



**TS-570D** HF Transceiver

- 100W HF Transceiver, 12VDC
- QSK • CW Auto Tune • Autotuner
- DSP • Large LCD Display • Elect. Keypad
- RCP2 Radio Control Program Compatible

**TS-870S** HF Transceiver

- DSP in I.F. Stage! • 100W, 12V DC
- Dual mode noise reduction
- Digital Filtering (no opt. filters req.)
- Built-in RS232, Windows software incl.



**TS-50S/TS60S** HF Trans. • 6M

- TS-50S - World's smallest HF trans.
- 100W out, (90W TS-60S, 50MHz only)
- SSB, CW, AM, FM, • 12V Gen. Cov. RX,
- 6.4 lbs., 7.16 x 2.4 x 9.32"
- 105 db dynamic range, 100 Mems.
- Opt. ext. ant. tuners available (TS-50S only)

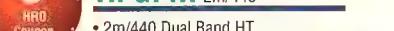
**Call For Special Low Price!**

**Call Now For Your Low Pricing!**

**TH-79A(D)**  
2M/440HT



**TH-G71A** 2m/440



- 2m/440 Dual Band HT
- 200 Mems • PC Programmable
- 6w 2m, 5.5w UHF @13.8 VDC
- Alphanumeric Display
- CTCSS Built It • Backlit Keypad

**Call For Low Intro. Price!**

**TH-22AT**  
• 5W  
• 2M HT, 5W optional  
• 40 memories  
• Encode Built-In



AZ, CA, CO, GA,  
VA residents add  
sales tax. Prices,  
specifications,  
descriptions,  
subject to change  
without notice.

**TM-261A** 2M Mobile

- 50W + Mid and Low • Mil-Spec
- 61 Memory Channels
- Alpha Numeric Function
- Dual Menu, DTMF Memory
- Backlit mic & built-in encode

**TM-V7A** 2M/440MHz

- 50W/35W • 280 Mems • Visual Scan
- Alpha Numeric • Enc/Dec & Duplexer Built-in
- Computer Programmable • 9600 Baud Ready
- Cool-blue Reversible LCD • Backlit Mic

**Call Now For Intro. Low Price!**



**TS-570S** HF + 6M Transceiver

- 100W HF, 100W on 6M, 12VDC
- QSK, CW Auto Tune • Autotuner incl 6M
- DSP • Large LCD Display • Elect. Keypad
- RCP2 Radio Control Program Compatible

**Call Now For Your Low Price!**



**TM-742AD** 2M/440MHz

- Optional 3rd band available • Back-lit mic
- Up to 303 memories • 101 per band
- PL Encode Built in • Detachable front panel

**Call Now For Your Low Price!**

Look for the  
HRO Home Page  
on the  
World Wide Web  
<http://www.hamradio.com>

**COAST TO COAST  
FREE SHIPPING**  
UPS - Most Items Over \$100  
Rapid Deliveries From  
The Store Nearest To You!





# AMATEUR TELEVISION

Web site: [www.hamtv.com](http://www.hamtv.com)

## GET THE ATV BUG

See who  
You are  
Talking  
to



ALL IN  
ONE BOX  
Only \$499

Total price shipped  
within 24 hrs of your  
call UPS surface in  
cont. USA, Visa/MC

### TC70-10 70CM 420-450 MHz Band >10 Watt ATV Transceiver

ATV is no more difficult or different than any voice mode except that you also plug in your camcorder to transmit, and your TV set to receive the picture. That's it - you're seeing as well as talking to other hams live and in color! No other radios, computers or other boxes needed to get on this live action video mode just like broadcast TV.

Show the shack, home video tapes, zoom in and describe projects, show computer graphics and programs, repeat SSTV or even Space Shuttle Video and audio if you have a TVRO. Go portable or mobile, do public service events, RACES, AREC, CAP, even transmit the local radio club meetings to those hams that can't make it.

DX is up to 90 miles snow free line of sight using 14 dBd beams. Adjustable RF output typically 2 to 14 watts p.e.p. to properly drive RF Concepts 4-110 100 Watt amp. Sensitive downconverter tunes whole 420-450 MHz band down to your TV ch 3. Check the ARRL Repeater Directory for ATV repeaters in your area or call us for info on other ATVers in your area. See the ATV section in chapter 12 of the ARRL Handbook.

**HAMS: Call, Write or Email for our 10 page ATV Catalogue for more info - We have it all!**  
Antennas, Amplifiers, Transmitters, Downconverters, Repeater modules, and more.

We also have wired and tested boards for the builder, R/C, Rockets and Balloon ATVers.

**CALL (626) 447-4565 M-Th 8AM - 5:30 PM PST.**

**P. C. ELECTRONICS**

2522 S. PAXSON Lane ARCADIA CA 91007

**VISA, MC, UPS COD**

Email: [tomsmb@aol.com](mailto:tomsmb@aol.com)

24 hr FAX (626) 447-0489

Tom (W6ORG) & MaryAnn (WB6YSS)

get more excited about our club. Club membership is a key to growth within the hobby. Clubs get people involved with learning more about other aspects of the hobby. They also are a great way of sharing equipment expense and talents. Clubs also spearhead the local efforts whenever unfavorable governmental legislation is proposed. If you are not a club member, please feel free to contact me to find the closest Amateur Radio club. PSHR for Sept: W3OKN 129, TIC (Sept) N3COR 100, WA3UNX 98, N3ON 55, W3NGO 50, WB8KPE 41, N3KB 30, N3WAV 27, WA3QNT 18, W3GJ 18, KC3NY 18.

Net	NCS	QNI	QTC	Sess
WPA CW	N3COR	234	89	30
WPA PHONE	KA3EGE	480	51	30
NWPA2MTN	WA3ZSC	958	35	28
WPA2MTN	KA3BGC	256	34	30

Erie Mailbag resumes operation Oct 13, 8 PM, local time. Best wishes for a safe and happy holiday season, and a prosperous 1998! 73 Bill, N3LLR.

### CENTRAL DIVISION

**ILLINOIS:** SM, Bruce Boston, KD9UL—SEC: W9QWB. SGL: WA9AQN. ACC: N9KP. STM: K9CNP. PIC: N9EWA. TC: N9RF. OOC: KB9FBI. Fire has destroyed a historic building complex in Canton. The International Harvester building went up in flames Aug 6, leveling nearly 2/3 of the 33 acre complex. Firefighters from 28 different fire departments fought the blaze for nearly 84 hours while volunteers, including a number of Amateur Radio operators, assisted with traffic, evacuation, and crowd control. The number of people involved numbered between 200-300. Among the volunteers were N9TYR, N9XJV, N9TTD, WB9KEW, KB9KAZ. On a happier note, The Fulton County Amateur Radio Club was involved in the Canton Friendship Festival Parade line-up in Sept. The parade had 23 sections and took 2 1/2 hours to setup. Emergency Coordinators throughout central Illinois attended a regional EC meeting in Lincoln on Aug. 16. Presentations were given by the Section Emergency Coordinator and Section Manager, as well as by K9ORP and WD9CIR. ECs from more than a dozen counties were represented at the meeting. The Metro ARC helped with the annual Parkside 5 mile run and 2.5 mile walk in Sept. The Peoria Area ARC is planning to offer Novice classes beginning in January. Young hams in the Peoria area can check-in to the youth net on 147.075- MHz Mondays at 9 PM. The Schaumburg ARC has voted to give up to 6 months of the club newsletter to new hams in the area. Members of the SARC are planning a tour of the Byron nuclear power plant. The Jacksonville ARC, Central Illinois RC, STARS, and several other clubs took advantage of the final days of summer and held club picnics. The North Shore RC is considering a DXpedition this winter to one of the islands in Wisconsin. NSRC member WV7T was awarded the Military Outstanding Volunteer Service Medal for his work in Amateur Radio and MARS. Over 1000 runners and joggers participated this year in Deerfield's traditional 4th of July 10K Mini-Marathon, and a number of amateurs from the area were on hand to provide communications. Members of the Lake County RACES group assisted with the Lake Zurich Triathlon. The Jacksonville ARS and the Western Illinois ARC have been designated Special Service Clubs for their commitment to Amateur Radio. To learn how your ARRL affiliated club can receive SSC status contact N9KP, the Affiliated Club Coordinator.

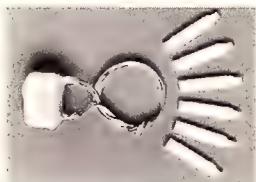
Net	Freq	Time (Local)
ISN	3.905	1800 Daily
ILN	3.665	1830 & 2200 Daily
ITN	3.680	1900 Daily
CTN	147.090+	2100 Daily
IL ARES	3.905	1630 1st & 3rd Sunday
Macon Co	442.250+	2100 Wednesday
IEN	3.940	0900 Sunday
IPN	3.855	1645 M-F; 0830 Sunday
NCPN	3.912	0700 Monday-Saturday
NCPN	7.270	1215 Monday-Saturday

July traffic: W9HLX 97, K9CNP 63, WB9TV 35, NC9T 24, KA9IMX 24, WA9RUM 7, W9FIF 6, W9VEY Memorial Net via K9AXS 8 with 180 check-ins. ISN report de WB9TVQ QN1 217, QTC 54, stations 31, 9RN report for August traffic 225, sessions 62 in 385 min. August traffic: K9CNP 88, W9HLX 68, KA9IMX 42, WB9TV 32, W9DT 32, NC9T 22, WA9RUM 7, W9FIF 6. WB9TVD ISN report QN1-217, QTC -58, sessions -28. Ninth region Cycle 4 report for September traffic 209, 60 sessions, 435 min, average 3.48, rate .480—ILN K9CNP KF9ME NS9F 95% rep. W9VEY Memorial Net via K9AXS 5 with 185 check-ins.

**INDIANA:** SM, Peggy Coulter, W9JUJ — SEC: K9ZBM. ASEC: WA9ZCE. STM: AA9HN. OOC: K9ARNY. SGL: WA9VQO. TC: W9MWY. BM: KA9QWC: Sympathy extended to the families and friends of Silent Keys, June 7, Jack F. Pallada, N9ICE, Indianapolis; June 8, Eugene Van Sickle, W9KJF, Indianapolis; June 25, Glen Fletcher, N9ZFB, Sharpsville; and July 5, Donna Shinabarger, AA9GJ, Daleville. They will be missed. If you noticed in the heading a change in our TC, yes, we have lost John Strawbridge, KF9IQ, who changed his call to K9IQ, to moving out of state. Our loss is OK gain. Good luck, John, on your new job and thank you for all your good works the past few years. We will miss you. We have a new TC. Ed Dunkin, W9MWY, just moving to South Bend has accepted the appointment. Thank you, Ed. We have a fine group of traffic handlers in the state, and I want to thank them for their dedication to the task. You will find them listed under D9RN and 9RN as well as the many others who QNI ITN, QIN and ICN. I want to recognize them for the unselfish work they do in the interest of Public Service. NMs ITN/W9UMH, QIN/WB9TUS, ICN/AA9HN, WN/WA9OHX, VHF/AA9HN, BBS/W9JU

## Stop Telephone RFI Forever With K-COM Telephone Interference Filters

K-COM filters are the choice of amateurs, telephone companies, telecommunications equipment suppliers, field service technicians and broadcast engineers because *they work!* Includes proven step-by-step instructions to stop even the most severe cases of telephone RFI. Fully assembled and available in the following interference rejection ranges: .5-3Mhz, 3-30Mhz, 26-60Mhz, 100Mhz.  
(Model RF-2 Hard Wired: .5-3Mhz & 3-30Mhz).



**The ugly little blob that  
really works!**

### Model RF-2 Hard Wired.

Insert interference rejection in telephone wiring where modular connectors are not used. Installs in phone jacks, behind wall mounted telephones and throughout the telephone system. \$10.95

**K-COM RF-1**  
MODULAR FILTERS - NOW AVAILABLE IN  
THREE VERSIONS - SINGLE LINE, TWO  
LINE AND COILED CORD.

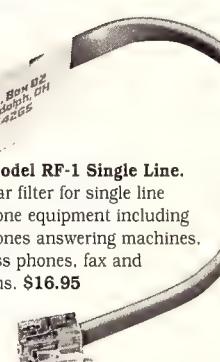


### New! Coiled Cord Filter

**Model RF-1 Coiled Cord.**  
Recommended when RFI enters through the coiled telephone cord. \$22.95

### Model RF-1 Single Line.

Modular filter for single line telephone equipment including telephones answering machines, cordless phones, fax and modems. \$16.95



### Model RF-1 Two Line.

The modular filter for two line telephone sets and multi station electronic key phone systems in business environments. \$22.95



UL listed to U.S. and Canadian safety standards

# K-COM

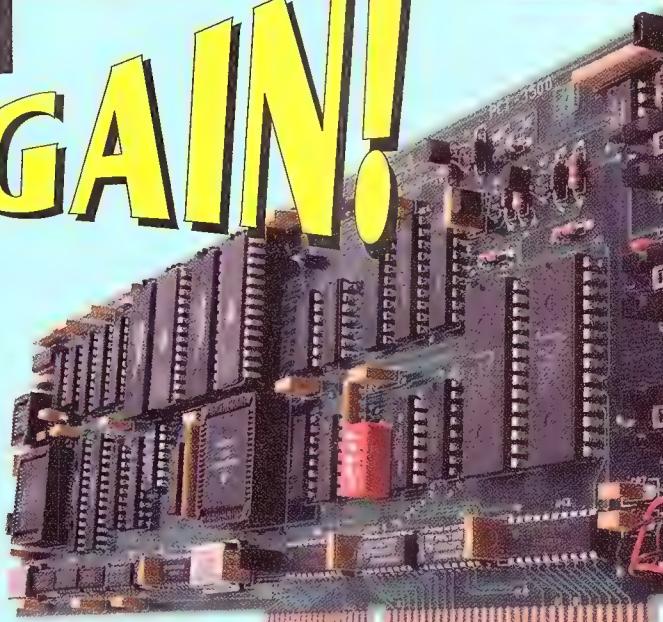
Mail check/money order to:

K-COM, Box 82, Randolph, OH 44265  
Free S&H in U.S. / Ohio Res. add tax.



Phone Orders: 330-325-2110 • Fax Orders: 330-325-2525

# HAL Breaks The Price Barrier AGAIN!



## P38 **HF DSP MODEM**

**A DSP Modem at "Old Style" Modem Prices  
Operate Clover & Amtor-Baudot-ASCII-Pactor  
All of these modes with DSP performance for only**

~~\$395~~ **\$295**

thru  
12/31/97

**Call or fax Mike, W9KVF or Mark, WB9HFK  
Phone (217) 367-7373 FAX (217) 367-1701  
e-mail:halcomm@halcomm.com http://www.halcomm.com**



**HAL Communications Corp.  
1201 West Kenyon Road  
Urbana, IL 61801 USA**



# BUTTERNUT

# HF5B BUTTERFLY BEAM

## ANTENNA

If you hunger for a directional antenna, but can't put up a full-size Yagi...

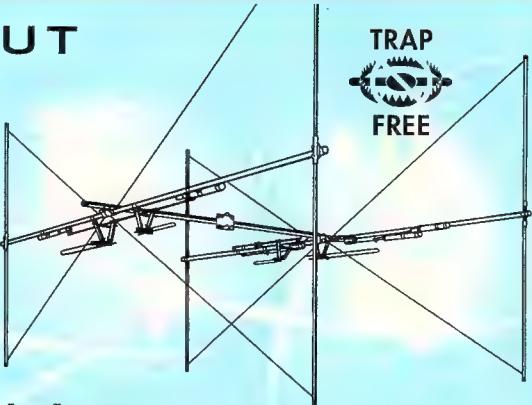
### WE'VE GOT THE ANSWER!

Designed for the amateur with limited space, it offers significant improvement over omnidirectional antennas. Light enough to turn easily with a standard TV antenna rotator, it mounts easily on a mast or roof tripod.

Call or write for Free New Color Brochure!  
(Ask for the designers Dirty Little Secrets!)

**630-238-1183**

831 N. Central Avenue, Wood Dale, IL 60191  
Fax: 630-238-1186  
<http://www.bencher.com> email: [bencher@bencher.com](mailto:bencher@bencher.com)



TRAP  
FREE

Wingspan: 12 ft. 6 in (3.8m)  
Boom Length: 6 ft. (1.8m)  
Turning Radius: 6 ft. 11 in (2.1m)  
Vert. Spreaders: 6 ft. (1.8m)  
VSWR @ Resonance: 1.5:1 or less all bands  
Frequency: 10,12,15,17,20M  
Minimum Height: 30 ft. (9.1m)



Net	Freq	Time/Daily/UTC	QNI	QTC	QTR	Sess
ITN	3910	1330/2130/2300	2239	493	3100	90
QIN	3856	1430/0000	no report			
ICN	3705	2315	no report			
IWN	3910	1310	2267	—	300	30
IWN VHF	Bloomington		462	—	450	30
IWN VHF	Kokomo		702	—	150	30
IWN VHF	Northeast		801	—	600	30
Hoosier VHF nets	(8 nets)		613	53	244	38

D9RN May report QTC 341 in 61 sessions IN participation 92% by K9GBR, W9UEM, KA9MSR and KA9DIG. June report QTC 247 in 58 sessions IN participation 90% by K9GBR, W9UEM, KA9MSR and KA9DIG. 9RN QTC 180 in 59 sessions by K9PUI, AA9HN, KJ9J, KO9D, WA9QCF, WB9UYU and W9FC. Tfc: W9FC-163, W9UWU-133, KO9J-95, WB9QPA-79, K9GBR-74, N9ZD-73, AB9AA-59, KJ9J-59, K9OIM-58, W9JJU-52, K9PUI-49, W9UWU-48, KA9QWC-35, KA9DIG-33, KA9EIV-29, W9EYH-22, K9RPZ-18, KB9WI-12, AA9HN-10, N9VTS-8, W9RTH-7, W9CSJ-7, K9OUP-6, W9KT-5, KB9NPU-4, AB9A-3, N9JAI-3, N9HZ-1, WB9NCE-1.

**WISCONSIN:** SM, Roy A. Pedersen, K9FHI—SEC: WB9SMM, STM: KA9KLZ, ACC: N9TD, SGL: W9RYA. OOC: W9RCW, PIC: K9ZZ, TC: K9GDF, ASM: W9CBE, K9UTQ, BM: WB9NRK. Watertown ARC had a tour of Ixonia Fire Station, KJ9J stepped in a hole and twisted his ankle. (Watertown Newsletter.) Interesting facts from History Buff MRAC, very nice article. (Hamateur Chatter). Do you know which environmental element causes the most deaths, injuries and damage? Floods? Hurricanes? Tornadoes? None of the above—lightning is the culprit. (Ozarks Newsletter) Greenfox picnic went well until the rains came but the auction was just about done at that time. Greenfox needs the help of its members, please. (Foxtales). Soon will be the time of the year that old Saint Nick will be around. Do you have your Christmas shopping done? Do you fellows have your antennas all ready for winter? W9KJR, Milt Peters, became a Silent Key July 24. He became a member of MRAC in 1946 and a life member in 1967. He became known as the man who built and gave away kaleidescopes, because they were too expensive in the stores. (Hamateur Chatter). Madison area repeater association hamfest is April 5, 1998, and is ARRL sanctioned at the new location John Q. Hammons Trade Center. W9JHW had eye surgery, and Gus says he can see better now than he has for many years. Fox Cities ARC had a good time at the EAA flyin. Ham radio will benefit from New Age Spacecraft, such as near Earth and interplanetary space environments. (QSO'R). Rock River Club Campers (RRRCC) had a good time camping, KA9KLZ, KB9KVD, N9TFQ, KA9NRH, KA9BAC, KA9BAE, K9FHI, but it was chilly one morning. KB9MKP, KB9QKH were visiting the campers one afternoon, campers don't go hungry. Is your club affiliated with ARRL? I just received a recent list of such clubs. There are 46 in Wisconsin. Sorry to report W9PKT a Silent Key. Thought for the day: Have faith in what you believe and don't give up on the future. I need more news from you for this column. Tfc: K9JPS-789, W9HW-779, WB9JSW-714, W9RCW-643, K9FHI-165, AG9G-137, N9BDL-93, KA9KLZ-81, W9CBE-78, W9YCV-76, N9CK-73, KA9FVX-64, N9KHD-54, KE9VU-52, W9WU-39, KG9B-33, K9GU-29, K9UTQ-29, K9HDF-29, KB9ENO-24, W9ODV-24, KA9BHL-23, K9LNU-20, K9DHR-19, N9JYI-16, W9PVD-8.

### DAKOTA DIVISION

**MINNESOTA:** SM, Randy "Max" Wendel, N0FKU— The annual meeting of Assoc of Emergency Mgrs was held at Ruttgers Lodge in late September. I, along with SEC Gary Peterson and ARES ECs Gerry Nies, N0NGW (Grand Forks) and John Engel, WA0LPV (Polk/E. Grand Forks) presented ARES to some 200+ emergency mgrs from around our state. I'm confident we opened more doors and gave ARES yet another boost with our presentation. Gary produced and showed an excellent 10-minute video of ARES flood action he filmed while in GF/EGF at flood time. Great job Gary and also to Gerry and John for their talks at the conference! What a great feeling to see our ARES ECs leading the way! Additionally, I'm also continually impressed with the ARES participation of folks in SE Minnesota. Groups from around Rochester to Winona, Spring Valley to LaCrosse really doing a great job! Not to mention the exercises...one in Winona on Sept 20 and yet another at Good Earth on Oct 12. Lots of participation from several officials and groups...state/local gov't officials, K-9 SAR teams, to name a few. YOU folks really set some GREAT examples...keep up the great work. Getting together and participating really helps keep continuity for your area. We have a new NM for our MN 75m Section Net: Jerry Fraser, W0WPN, of Marine/St. Croix, replaces Judy Mortenson, WB0WNJ, of Tracy. Thanks, Judy, for all you've done, and welcome Jerry who has been a supportive participant on the evening net. We have a new Bulletin Manager, Dave Mangin, N0TXW, of St Paul replaces Rob Beyer. We seek those ARRL members who would like to officially themselves as an informative resource for their respective area. Please contact Dave for sign-up as Official Bulletin Station, 612-633-2317. We need a good network of OBSS to help disseminate bulletins and other pertinent info to hams statewide in a time effective manner and we need YOUR individual help to create this system, acting as a valuable service in your ham community. I urge all hams and radio clubs to help us seek field organization members willing to help meet our goals in helping you and other radio amateurs. Contact me (QST p. 12) de N0FKU, Public Service: WB0WNJ, W0LAW, K0PIZ, WA0TFC, W0HPD, W0GRW, KB0AII, KN9U, KA0IZA, KB0AJ, K0WPK, W3FAF, WD0GUW, KB0OHI, N0JP, K0DNM, N0AU, K0OGI.

**NORTH DAKOTA:** SM, Bill Kurtti, W0CM— SKYWARN is slowing down now that fall is upon us. A big thank you to all the section hams that have made this program a success in our section. Part 2 of 2 by WA0YSF, Flood Fight in the Northern Red River Valley by the Cavalier County ARC. The cities of Drayton and Pembina were saved by their dikes, those outside of the dikes were not as fortunate. After the crest had passed, we continued to provide support to Red Cross, Salvation Army, US Coast Guard, National Guard and Sheriff's Dept. as needed. On April 30, we went on standby. This was our second flood, with 1996 being almost as bad. We are gaining experience and things seem



## World's best ham weather station\*

The **ULTIMETER® 2000** tracks more than 100 values to help you alert others to dangerous weather extremes and protect your own equipment.

Instant access to: • current values • today's highs and lows • long term highs and lows • time/date for all highs/lows • rain totals† for today, yesterday, and long term • alarms, and much more. Easy to install.

Features superbly accurate: • barometric pressure • 3-hr. pressure change • indoor/outdoor humidity† • dew point† • wind speed/direction • indoor and outdoor temperature • wind chill temperature • rainfall†.

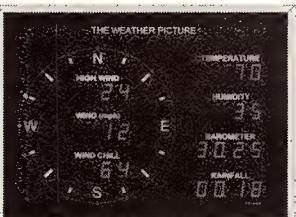
Only \$379 plus shipping (†Optional sensors add'l.) Other ULTIMETER models starting at \$179.

\*Even WeatherWatch magazine (May, '96) concludes "the best we have seen."

## NEW! The Weather Picture®

An eyepopping add-on to your ULTIMETER

This new wall unit with its elegant teak or brushed aluminum frame displays all the vital weather data you pre-select, without having to press a single button. Big red numerals are easy to read from across the room, day or night. Interfaces with your ULTIMETER Weather Station, lets you customize data display. In two sizes. Introductory savings in effect thru 1/31/98.



Size shown: 15 1/4" x 11 1/4"

**732-531-4615 1-800-USA PEET FAX 732-517-0669**

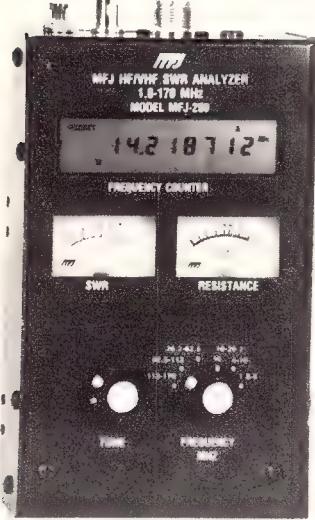
**PEET BROS. COMPANY, 1308-712Q Doris Ave., Ocean, NJ 07712**

Our 22nd Year

Visit our Home Page to see and try our Weather Stations: [www.peetbros.com](http://www.peetbros.com)

# MFJ HF/VHF SWR Analyzer™ with RF Resistance Meter

Read your antenna SWR from 1.8-170 MHz... 10-digit LCD frequency counter... RF Resistance Meter™... smooth reduction-drive tuning... simple-to-use...



MFJ-259 **\$239.95** If you work with antennas, MFJ's revolutionary new SWR Analyzer™ is the best investment you'll ever make! Now you can diagnose a wide range of antenna problems instantly with one easy-to-use instrument.

## 1.8-170 MHz SWR Analyzers™



MFJ-249 **\$219.95** MFJ-249 HF/VHF SWR Analyzer™. Same as MFJ-259 but less RF resistance meter. Includes 10-digit LCD frequency counter, full 1.8-170 MHz coverage and smooth vernier tuning.



MFJ-209 **\$109.95** MFJ-209 HF/VHF SWR Analyzer™ is same as MFJ-259 without LCD frequency counter and RF resistance meter. Has jack for external frequency counter, smooth vernier tuning.

### What the MFJ-259 Does

The MFJ-259 gives you a complete picture of your antenna's performance anywhere between 1.8 and 170 MHz -- you can even check SWR outside the ham bands without violating FCC rules. Set the bandswitch and tune the dial--just like your transceiver. SWR is displayed instantly!

### RF Resistance Meter™

Does 2:1 SWR mean 25 ohms or 100 ohms? The new MFJ-259 tells you at a glance!

Now you can measure RF resistance up to 500 ohms at minimum SWR -- instantly -- on MFJ's exclusive side-by-side RF Resistance and SWR Meters!

Take the guesswork out of building matching networks and baluns for your antennas.

Watch the effects of spacing on radiation resistance as you adjust your antenna.

### Here's What You Can Do...

Find your antenna's true resonant frequency from the shack.

Tune the antennas on your

tower and watch SWR change instantly as you make each adjustment. You'll know exactly what to do by simply watching the display.

**Tune** critical HF mobile antennas in seconds -- without subjecting your transceiver to high SWR.

**Measure** your antenna's 2:1 SWR bandwidth on a single band, or analyze multiband performance over the entire spectrum from 1.8 to 170 MHz!

**Measure** inductance, capacitance, resonant frequency of tuned circuits, transmission line velocity factor/impedance/loss. Test RF chokes, transformers, baluns.

**Adjust** your tuner for a perfect 1:1 match without creating QRM.

**And** this is only the beginning! The MFJ-259 is really four test instruments in one: an accurate RF signal generator, a high resolution 170 MHz frequency counter, RF Resistance Meter™ and an SWR Analyzer™.

### Free Manual

MFJ comprehensive 18 page instruction manual is packed with useful applications -- all explained in simple language you can understand!

### Carrying Pouch with Window



MFJ-29B **\$24.95** Tote your MFJ-259

/249/209 SWR

Analyzer™ anywhere

with this custom Carrying Pouch. Made with a special foam-filled fabric, it cushions blows, deflects scrapes, and protects knobs, meters and displays from harm.

**Clear** protective frequency display and window cutouts for knobs let you use it without taking it out of pouch. Fully adjustable webbed fabric carrying strap has snap hooks on both ends. Wear around waist or over shoulder.

Keep your analyzer safe and looking new! MFJ-29, \$19.95, no window or cutouts.

## MFJ 2 Meter FM SignalAnalyzer™

Measure signal strength over 60dB range - Check and set FM deviation - Measure antenna gain, beamwidth, front-to-back ratio, sidelobes, feedline loss in dB - Analyze audio quality with scope

**NEW!**

MFJ-224 **\$159.95**

MFJ's revolutionary handheld 2 Meter FM SignalAnalyzer™ lets you measure signal strength with over 60 dB dynamic range; check and set FM deviation of your packet and voice radios; measure antenna gain, beamwidth, front-to-back ratio, sidelobe suppression and actual feedline loss in dB.

Plug in any scope and your MFJ FM SignalAnalyzer™ becomes a service monitor! It lets you visually analyze modulation wave forms, measure audio distortion, noise and instantaneous-peak deviation.

You can tune in any signal between 143.5 and 148.5 MHz. It's built-in discriminator-meter function makes accurate tuning simple and easy.

You can plug in headphones to help you tune in and identify signals easily. There's also a battery check function. Uses 9 volt battery. Measures 4x2½x6¼ inches.

Here are some countless jobs your MFJ FM SignalAnalyzer™ can perform... evaluate antenna performance, detect feedline faults, plot field strength patterns, position your antennas, measure preamp gain, track down hidden transmitters, check and set deviation, analyze audio quality, scan the band, tune transmitters and filters, and much more!

The MFJ-224 2 Meter FM SignalAnalyzer™ may be the most useful 2 Meter handheld test instrument you may ever own.

For free manual write or call MFJ.

### Take It Anywhere

The MFJ-259 is fully portable, powered internally by 8 AA batteries or 110 VAC with MFJ-1312B, \$12.95. It's in a rugged all metal cabinet that's a compact 4x2½x6¼ inches. Take it to remote sites, up towers, on DX-peditions -- anywhere your antennas are located.

For rough service, pick up a convenient MFJ-29B, \$24.95, padded carrying pouch to keep your MFJ-259 close at hand and looking like new.

### How Good is the MFJ-259?

MFJ SWR Analyzers™ work so good, many antenna manufacturers use them in their lab and on the production line -- saving thousands of dollars in instrumentation costs! Professional installers and technicians use them worldwide.

### Get More by Paying Less

With the MFJ-259, you get full 1.8 to 170 MHz coverage, simple operation, instantaneous readings, a high accuracy frequency counter and MFJ's exclusive RF Resistance Meter™ -- all for a low \$239.95.

### Dip Meter Adapter



MFJ-66 **\$19.95**

Plug a dip meter coupling coil into your MFJ SWR Analyzer™ and turn it into a sensitive and accurate bandswitched dip meter.

With a dip meter you'll save time and take the guesswork out of winding coils, measuring inductance and capacitance, measuring velocity factor and electrical lengths of coax. Determine resonant frequency of tuned circuits and measure Q of coils. Set of two coils cover 1.8-170 MHz depending on your MFJ SWR Analyzer™.

### 440 MHz SWR Analyzer™

MFJ-219 **\$99.95** enna 420 to 450 MHz -- just plug coax of your antenna into SO-239 connector, set frequency and read SWR. Uses microwave integrated circuits and microstrip technology. Jack for external frequency counter. 7½x2½x2½ in.

MFJ-219N, \$99.95, same as MFJ-219 but with "N" connector.

MFJ-219 uses 9 volt battery or 110 VAC with MFJ-1312B, \$12.95.

**Free MFJ Catalog and Nearest Dealer... 800-647-1800**

<http://www.mfjenterprises.com>

• 1 year unconditional guarantee • 30 day money back guarantee (less s/h) on orders from MFJ • **FREE** catalog

**MFJ ENTERPRISES, INC.**  
Box 494, Miss. State, MS 39762  
(601) 323-5869, 8:430 CST, Mon.-Fri.  
FAX: (601) 323-6551; Add s/h  
Tech Help: (601) 323-0549

Prices and specifications subject to change © 1997 MFJ Enterprises, Inc.

**MFJ... the world leader in ham radio accessories!**

VISION, INNOVATION,  
CREATIVITY, AND  
RESOURCEFULNESS.  
WHERE THEY TAKE  
YOU IS UP TO YOU.

### PORLAND, OREGON

Go as fast and as far as your abilities take you - in the rapidly growing world of GaAs Integrated Circuit technology. The sooner you apply, the faster you can get things going - in a very positive direction. Consider the following positions:

#### APPLICATIONS ENGINEER

You will provide customer support for circuit applications, board layout, and circuit evaluation. You will also act as liaison between the customer, design department and manufacturing. You must have a BSEE degree and at least 3 years' experience with PCB layout, circuit design, circuit tuning and analysis, as well as strong communication skills. Reference job # QST9766.

#### RFIC PRODUCT ENGINEER

You will participate in the introduction of new RFIC products, develop RF test plans/strategies, analyze yield data, provide customer/applications support, and develop backend test flow. Requires a BSEE degree and at least 3 years' experience in RF circuit testing and analysis using spectrum analyzers and synthesizers. Fluency with C and UNIX is preferred. Reference job # QST9742.

#### RFIC TEST ENGINEER

We are seeking an experienced Test Engineer to participate in the introduction and qualification of new RFIC products, including characterization, yield analysis and RF testing. You will also support our manufacturing through process improvements and cost reduction strategies. You must have a BSEE degree (or equivalent) and at least 4 years' experience in IC testing and characterization. You must also have experience with the manufacturing process and analysis, and UNIX and C++ coding. RF testing experience is preferred. Reference job # QST9748.

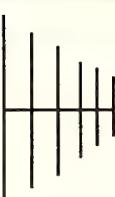
TriQuint offers competitive salaries and a comprehensive benefits plan including profit sharing, stock options and stock purchase programs. For immediate consideration, send or fax your resume to: TriQuint Semiconductor, Human Resources- (Indicate Ref. #), 2300 NE Brookwood Parkway, Hillsboro, OR 97124, Fax (503) 615-8900, email: [alans@tqs.com](mailto:alans@tqs.com). See us on the web at [www.triquint.com](http://www.triquint.com). No phone calls, please. We are an equal opportunity employer.



## LOG-PERIODIC ANTENNAS

THE INTELLIGENT CHOICE

MODEL	ELEMENTS	COVERS	BOOM	PRICE
T6	6	13-30 MHz	12 FT	\$395.00
T8	8	13-32 MHz	18 FT	\$555.00
T10	10	13-33 MHz	24 FT	\$695.00
T12	12	13-33 MHz	30 FT	\$855.00
T24	24	28-1300 MHz	12 FT	\$365.00
T31	31	50-1300 MHz	12 FT	\$295.00



LOG-PERIODIC DIPOLE ARRAYS -- All Of Those Bands With Only a Single Feedline  
(Surface shipping pre-paid to 48 states)



HC 81, Box 347A  
Junction, Texas 76849  
PH/FAX 915-446-4510

**TENNADYNE**

(Since 1989)

[tennadyne@juno.com](mailto:tennadyne@juno.com)

to be going smoother as we learn. Now it's time for SKYWARN to get active, if it would just rain! We have gone from the worst flood of the century to drought in just a couple months. Harold McConnell, WA0YSF, Pembina County RACES Goose River Net 1985 kc Sunday 8:30 AM 4 sess 44 QNI 2 QTC KE0XT mgr Data net, 3937 kc daily 6:00 PM, 30 sess 625 QNI 41 QTC KE0XT mgr.

**SOUTH DAKOTA:** SM, R. L. Cory, W0YMB—Dakota Chapter 102 QCWA will operate a special event station next Feb 21-22 and will be using their new club call sign W0DAK. This will be in celebration of their 21st anniversary. Watch for more details on this later. Pierre ARC is planning a special event station for next Aug to Honor Oscar Micheaux a black pioneer who wrote books and produced movies. He was the author of the Conquest. There was plenty of food at the LARK picnic at Watertown on Sept 20. Eleven people came to the event and the club paid for 35 meals that were catered. A 440 repeater is going to be installed at the Big Stone power plant. Another one is in the planning stage for a link between Arlington and their 67 machine but this one is not set in concrete. Participation has declined on the novice net during August. It was 2.75 average for the four sessions. How about giving them some help? Sunday evening at 7 PM central on 3700 kHz. The upper HF bands are improving as we are coming out of the bottom of the skip cycle. Traffic reported for September was 497.

#### DELTA DIVISION

**ARKANSAS:** SM, Roger Gray, N5QS, e-mail [n5qs@arrl.org](mailto:n5qs@arrl.org) — Christmas is coming up and December is dedicated to parties and fun. This is also the time of year for the low bands to come alive. I have heard that the interest in Amateur Radio follows the sun spot cycle, and from my short time in the hobby this could be true. We are coming up on a period of new activity on the upper HF bands that promises to be lots of fun. This would be a good time to encourage someone to become a ham or to upgrade their license so they can enjoy all the great fun on HF. The school Club Roundup is coming up February 10-14. This is a very good time to promote our hobby. Now is the time to find a local school and set up a station for a week and show the kids what we do and how much fun it can be. Another idea for this event is to work with your local school and make some handouts for the kids to take home to their parents and invite them to visit the station sometime during the event. Till next month take some time to enjoy this wonderful hobby. I hope Santa brings you a lot of new Amateur Radio toys. Tfc: W5RIT 80. PWSR: W5RIT 119.

**LOUISIANA:** SM, Lionel A "Al" Oubre, K5DPG, e-mail [k5dpgr@arrl.org](mailto:k5dpgr@arrl.org) Web Page [www.asp.net/k5dpgr](http://www.asp.net/k5dpgr) —ASM: KB5CX. ACC: KA5IJU. BM: K5ARH. TC: K5EFZ. SEC: KA5YDJ. OOC: WB5CXJ. PRC: KB5QVI. STM: KG5GE. NM LTN: WB5ZED. NM LSN WB5CDX. NM LCW: W4DLZ. I wish to take this opportunity to wish each and all of you and your families a very Merry Christmas and a Happy New Year. May 1998 bring you all the good things of life and that new rig that Santa promised! This has been the Year of Public Service for Amateur Radio. There has been a noted increase in the number of events being reported to this office. Thanks to all of you that participated. Public Service is the major activity that helps to justify the retention of our amateur bands. Let us all make a resolution to participate in at least one event during 1998. Hopefully each of you has exercised your rights and voted in the Division Election. Up coming hamfest are: Minden Dec 6, Hammond Jan 17, Lafayette March 13-15. Louisiana section net schedule: LTN 6:30 PM, local, 3910 kHz, nightly, K5DPG, LSN 8:30 PM, local, 3673 kHz, nightly, W4DLZ NM, LSN 8:30 PM, local, 3713 kHz, Mon-Fri WB5CDX NM/KK5WG Asst. Reports Sept: LTN QNI 326 QTC 116 in 30 sess; LSN QNI 71 QTC 11 in 30 sess. LCW QNI 122 QTC 37 in 29 sess. DRN5 LA represented 100% by KG5GE, K5WOD, K5IQZ, WB5ZED, WB5CDX, AB5YS, N5NI, WA5LHL, K5DPG. PWSR: WB5CXK 73, W4DLZ 78, KK5WG 84, K5MC 93, KG5GE 110, K5WOD 116, WB5ZED 150, K5DPG 166, K5IQZ 286. Tfc: WB5CXK 4, K5WOD 6, KK5WG 14, K5DPG 77, KG5GE 51, W4DLZ 34, K5IQZ 436.

**MISSISSIPPI:** SM, Ernie Orman, W5OXA—ASM: K5JRC. SEC: . STM: KB5W. OOC: WV5Y. BM: W5EPW. PIC: AA5SP. SGL: KB5ZKK. TC: N4KMH. ACC: K5VXV. Home Page is <http://users.aol.com/w5oxa/hpage.htm> I would like to take this opportunity to thank all of the operators that helped out in the ARRL SET for 1997. There is always much work to do and it takes time to do it. Those that give of their time and efforts are to be highly commended. Throughout this state, I keep running into those kinds of ham operators. They make effort well worth it. MISS. CAR TAGS. We now have an official Amateur Radio car tag for our state. I have a replica of it on the web page newsletter. It is not exact, but will give you an idea as to what it will look like. Hope you like it. It's the best we could do. Net reports Sept. DRN5: 60 sess, 571 QTC, MS rep 100% by W5OXA, N5XGL, K5DP, W5HKW AND N55M. JC Emgr Net 30 sess; 447 QNI; 33 QTC; 96 EP. Laurel ARC (VHF) 5 sess; 106 QNI; 1 QTC. Lowndes Co ARC sess; QNI; QTC Magnolia Net: 30 sess; 830 QNI; 4 QTC. MSPN 30 sess; 229 QNI; 42 QTC. MS Baptist Net: 4 sess; 21 QNI; 0 QTC; EP. MS Slow Net Sess; QNI; QTC. MS/LA Emgr Net: 4 sess; 103 QNI; 0 QTC; emgr sess PBRAS Net (North) 30 sess; 740 QNI; 149 EP; Hattiesburg A.E. Net 4 sess; 79 QNI; 4 QTC.

**TENNESSEE:** SM, O. D. Keaton, WA4GLS—ASM: WB4DYJ. PIC: W4TYU. STM: WA4HKU. ACC: WA4GLS. OOC: AD4LO. TC: KB4LJV. SEC WD4EKA presented the ARRL Charter of Affiliation to John County ARC on Sept. 16th & SM, WA4GLS presented the ARRL Charter of Affiliation to TN Contest Group on Sept 6th. This brought the total TN ARRL Affiliated clubs to 43. Ten other clubs have inquired into the affiliation process during this year. Hope all become affiliated in the near future. ARRL affiliation is desirable because it is profitable to both the club and ARRL. DARC is fortunate to have Delta Division's Vice Director, Mr Henry Leggette, WD4Q and Mr James Butler, KB4LJV, TN Section's Technical Coordinator, as club members. Both had articles in Sparks this month. Thanks to BSFARC members KE4RKJ, KE4YIH, W4NPL, KE4QQF, WA4WMN and KF4MVS for providing communications for the Ride the Edge, KE4UIW was there as part of the association. C.A.T.S. (Communications and Technology Society) added 145.23 repeater to its system. According to the report in Spectrum this month, C.A.T.S. repeater system consists of

# MFJ pocket size Morse Code Tutor

Learn Morse code fast, anywhere . . . LCD display lets you check your copy instantly . . . Easy no-code Beginner's Course . . . Takes you beyond Extra Class . . . Customized Practice . . . Plain English QSOs . . . Word Recognition Mode™ . . . Interactive Mode™ . . .

Learn Morse code anywhere, anytime with this tiny MFJ Pocket Morse Code Tutor™!

Take it everywhere! Enjoy code practice at home, going to work, on vacation, on a plane or in a hotel -- no matter where you are.

MFJ-418 gives you a large LCD display that reads out letters, numbers and punctuation in plain English. See code as it is being sent!

MFJ's proven Beginner's Course takes you from zero code speed to solid copy fast!

Realistic plain English QSO practice helps you pass your FCC code exam.

High-speed practice takes you to Extra Class and beyond . . .

Practice copying words as one sound -- not individual characters. Instant word recognition makes you a true, high-speed CW pro.

InstantReplay™ Check your copy instantly!

MFJ's interactive mode lets you set the pace -- you decide when to copy the next group and how many -- not the tutor.

Easy-to-use -- choose from menus on the LCD display -- no instruction manual needed!

## Beginner's Course

QST rate MFJ tutors "the clear choice for beginners". Follows ARRL/VEC format.

MFJ-418 takes you from knowing zero code to solid copy fast! You learn individual letter, number and prosign sets first. As you do, previously learned sets are combined with new sets to reinforce all that you have learned.

## InstantReplay™

Practice copying and then replay to instantly check your copy on the LCD display.

## Custom Character Sets

If you have trouble with certain characters, you can build and save a custom set of these for extra practice -- an MFJ exclusive.

## Realistic Plain English QSOs

You can practice copying realistic on-the-air style plain English random QSOs.

They'll help get you ready for your FCC exam. When you're comfortable copying these QSOs, you're ready to pass and upgrade!

They'll also give you plenty of confidence before you make your first real contact.

MFJ's CodeTest™ set lets you practice only the characters required on FCC exams.

## MFJ Word Recognition Mode™

MFJ's Word Recognition Mode™ gives

## MFJ Code Practice Oscillator



MFJ-557  
\$24.95

Learn to send Morse code with MFJ-557. Straight key with adjustable travel and tension, and built-in speaker with volume and tone controls lets you practice to your heart's content. Earphone jack. Heavy non-skid steel base stays put as you tap out Morse code. Use 9V battery or 110 VAC with MFJ-1305, \$12.95. MFJ-550, \$7.95, telegraph key only.

you hundreds of commonly used words in amateur radio. Practice recognizing entire words instead of individual letters.

Learn to copy words without writing it down and carry on an entire CW conversation without paper -- just like pros on 40 Meter CW.

You can save 10 words of your choice for word recognition practice -- an MFJ exclusive.

## You'll never run out of practice

Select letter, number, punctuation, prosign or code test sets, random call signs, random



MFJ-418  
\$79.95

words, QSOs or combination sets for practice -- you'll never run out of study material.

You can even make up and save your own word and character sets for practice.

## MFJ InteractiveMode™

MFJ InteractiveMode™ lets you decide when to copy the next or previous group and how many -- great for beginners.

## Normal or Farnsworth

Select normal or Farnsworth spacing.

Farnsworth makes it easier to recognize entire characters. It stops the tendency to count individual dots and dashes that slows learning.

Farnsworth character speed is adjustable 10 to 60 words-per-minute for high-speed practice.

## Fixed or Random Length Groups

Use fixed length or more realistic random length groups. Up to 8 characters per group.

## Change Speed on the Fly

Change speed on the fly while you're playing a session -- 3 to 55 words-per-minute.

## 2 Meter IntermodFighter™

Intermod causing squeaks, squawks, unidentified voices and other noises all across the 2 Meter band? Can't use your radio?

MFJ IntermodFighter™ eliminates intermod by reducing interference up to 50 dB with three high-Q bandpass filters.

Plugs between radio and antenna. MFJ-713, \$59.95. For handhelds, has BNC connectors. Uses 9V battery. MFJ-714, \$59.95. For mobile rigs, has SO-239 connectors. Uses 12VDC.

MFJ-713  
MFJ-714  
\$59.95

## No Instruction Manual needed!

Choose from easy-to-use menus on LCD display. Simple 3 button operation.

## SettingSaver™

Your settings are automatically saved, ready to use next time -- no more #%%\* resets!

## Large LCD Display

Read words, letters, numbers and punctuations in plain English as code is being sent. It's a powerful sound and sight aid!

Check your copy, select from menus and program custom characters and words.

LCD has 2 lines and 32 huge 1/4" high-contrast characters.

## SilkySmoothSidetone™

Only MFJ gives you SilkySmooth Sidetone™ with TruTone™ sinewave and SoftStart™ dots/dashes -- lets you concentrate on learning without the distraction of harsh keyclicks. Use earphones for private practice or built-in speaker for groups.

Adjustable volume. Loud, powerful audio amplifier. Variable pitch 300-1000Hz.

## Pocket Size

Fits in shirt pocket with room to spare!

Smaller than a pack of cigarettes -- tiny 2 1/4" x 3 3/4" x 1 in., weighs less than 5 1/2 oz.

Toss it in your briefcase, travel bag or stash in your car's glove compartment and you'll always have it ready for instant practice.

Uses 9 volt battery. Not included.

## Tapes Can't Compare

Tapes play the same old boring stuff over and over again. Unlike tapes, you'll never memorize the MFJ-418 random code sessions.

You'll pay more for a few sets of code tapes than an MFJ-418. The MFJ-418 is less expensive, lots of fun and far more effective.

## More pocket size MFJ Morse Tutors

**MFJ-417, \$59.95.** Random characters, words, QSOs. Selectable character sets. *CombineSet™* Fixed or random length groups. Instant replay. Normal or Farnsworth. 3 to 35 WPM. *SettingSaver™*. *SilkySmoothSidetone™*. Adjustable pitch 300 to 1000 Hz. Volume control. Use earphone for private practice. No LCD.

**MFJ-413, \$39.95.** Similar to MFJ-417, less random words, QSOs, *SettingSaver™*.

**MFJ-411, \$69.95.** Widely acclaimed original. Has most of the features of MFJ-418, no LCD.

## Get Yours Today!

Enjoy more ham band privileges -- learn Morse code and upgrade! Order yours today!

## 12/24 Hour Clock/ID Timer!



MFJ-116, \$14.95. ID buzz every 10 minutes. Big 5/8" red LED digits. Loud/soft alarm. Uses 110 VAC. 9V battery backup. 4 1/2" x 2" x 4" inches.

## Free MFJ Catalog

Nearest dealer/Free Catalog . . . 800-647-1800

<http://www.mfjenterprises.com> FAX: (601) 323-6551  
• 1 year unconditional warranty • 30 day money back  
guarantee (less s/h) on orders from MFJ • Add s/h

**MFJ ENTERPRISES, INC.**  
P.O. Box 494, Miss. State, MS 39762  
(601) 323-5869; 8:40-30 CST, Mon-Fri  
Technical Help: (601) 323-0549

Prices and specifications subject to change. ©1996 MFJ Enterprises, Inc.

**MFJ . . . the world leader in ham radio accessories**

**SSB** U.S.A. VHF UHF SHF  
ELECTRONIC SPECIALISTS 717-868-5643

NEW PRODUCTS: SP-2000 & SP-7000 Helical Filter Preamps  
TRANSVERTERS: LT230S 1296MHz. 15 Watts 1dB NF Call  
LT130S 2304MHz. 10 Watts 1dB NF Call  
DSP-NIR DIGITAL SIGNAL PROCESSOR from DANMIEC 374.95  
SSB ELECTRONIC USA is now the MUTEK LTD. US DISTRIBUTOR  
Model MHz .NF GAIN PTT/VOX S  
SP-6 50 <.8 20 Adj. 750/200W 249.95  
SP-2000 144 <.8 20 Adj. 750/200W 249.95  
SP-220 222 <.9 20 Adj. 650/200W 249.95  
SP-7000 432 <.9 20 Adj. 500/100W 249.95  
SP-23 1296 <.9 18 100/10W 359.95  
SP-13 2304 1.2 18 50/10W 379.95  
LNA 144 <.4 18 NA 219.95  
LNA 432 <.5 18 NA 219.95  
DX 1296 <.6 18 NA 249.95  
DX 2304 <.9 18 NA 249.95



The SP-2000 and SP-7000 are NEW Ultra Low Noise mast mounted GaAsFET Preamplifiers with Helical Filters for the ultimate in weak signal performance. SSB Electronic's SP Series preamplifiers feature: Low Noise figures, high dynamic range, dual stage design, adjustable gain, Helical or Bandpass filters, voltage feed via the coax or a separate line plus the highest RF-Sensed (VOX) and PTT power ratings available of any preamplifiers on the market today.

**WiNRADIO** 500KHz-1.3GHz Wideband \*  
PC Receiver Card



Advanced radio  
receiver technology  
and the power  
of your PC!

WiNRADIO is a new concept in radio communications that turns your pc into a wide band radio receiver/scanner that covers : 500KHz - 1.3Ghz. Operating under our powerful windows based WiNRADIO software, your PC can be operated exactly like a professional radio receiver with displays that you would only find on military receivers with computer graphical interfaces. The WiNRADIO pc card receives SSB, CW, AM, FM-N plus FM-W and includes features such as: unlimited memory lists, multiple block scans, automatic list build, sensitivity threshold, preamp in/out, squelch, volume control, S-meter etc.

Dealer Program Available \*Cellular freq's excluded \$499.00

**AIRCOM PLUS & Aircell 7**

Aircor Plus is the new .425(OD) coaxial cable that everyone is talking about. Due to its outstanding electrical and mechanical specifications and its ultra low loss characteristics

AIRCOM PLUS is extremely suited for VHF, UHF & SHF applications. AIRCOM PLUS outperforms any cable in its price class. Aircor Plus's mechanical construction incorporates a solid flexible copper conductor, unmovable honeycomb expander, a coated solid copper foil plus copper braid for 100% shielding. The cable is then covered with a tough UV protected exterior jacket. Unlike other cables that change impedance when sharply bent AIRCOM PLUS's unique honeycomb expander allows no migration of the center conductor. A high quality waterproof N-conn. which is rated past 10GHz, has been developed for AIRCOM PLUS.

Aircell 7 is a 7mm (.287"OD) low loss extra flexible cable that is excellent for HF operation and is used well up into the microwave region. Aircell 7 begins with a flexible stranded center conductor which is surrounded by gas injected PE foam for low loss. 100% shielding is achieved by the use of both coated copper foil and copper braid. A tough outer jacket of UV protected PVC completes its construction. PL259, BNC and TYPE N connectors are available. AIRCOM meets ISO9002 & NATO AQAP stds.

**AIRCOM PLUS / AIRCELL 7** DB Loss per 100 feet  
Freq. MHz. 10 145 432 1296 2304 3000 5000  
AircorPlus .27 1.37 2.50 4.63 6.55 7.62 10.39  
Aircell 7 .81 2.41 4.30 7.96 11.55 13.35  
AIRCOM PLUS: 25 Meters/82ft. \$71.00 50Meters/164ft. \$134.00  
100Meters/328ft. \$252.00 AIRCEL 7 .49 per ft  
AIRCOM PLUS Type N Connector.....\$8.95

**MUTEK LTD** Mutek LTD. manufactures replacement  
Front-end/IF boards containing low  
noise front ends, DBM's and new IF filters for FT736R, IC271's & FT221  
RPCB736-2m/70cm .Call! RPCB736-6m... Call! RPCB271ub...Call  
IC251... .... Call! FT225... .... Call!

**M2** HF -VHF Antennas & Rotors SUPER DEALS Call!!!

HOURS: M-F 6:30PM-11:00PM WEEKENDS 9:00AM-11:00PM

**SSB ELECTRONIC** Send 2 stamps for our latest  
flyer. MC/VISA Accepted  
<http://www.ssbusa.com>  
124 Cherrywood Dr. Mountaintop, Pa. 18707

## THINGS TO DO:

1. Help a friend become a HAM.
2. Upgrade the "Quick and Simple" way.

## VIS Study Cards

call today 1-800-655-4267

## VIS Amateur Supply

P.O. Box 284  
Coffeyville, ALA 36524

ALL MAJOR CREDIT CARDS ACCEPTED

## CODE IS SO EASY!

Learn to copy code in no time at all.

**CW Mental Block Buster II** uses NLP-Hypnosis, the world's most advanced mind technology. Only \$27.95 + \$3 S/H US.

### Alternative Arts

800-425-2552 / Fax 941-403-8446

<http://www.qth.com/cweasy/>

ALT\_ARTS@compuserve.com

## World's Best Selling

### AMATEUR RADIO LICENSE COMPUTER-AIDED INSTRUCTION SOFTWARE

**\$39.95** Plus \$3  
Shipping

Learn at your IBM/compatible PC! Nine 3 1/2" and 5 1/4" disks cover all written and Morse code exams —

Novice through Extra. Review all 2,000 questions, take sample exams, learn Morse code, build telegraphy speed...and more!  
Free bonus! Complete Part 97 FCC Rule Book!



CALL TOLL FREE

**1-800-669-9594**

VISA or MasterCard Accepted

The W5YI Group

P.O. Box 565101

Dallas, TX 75356

## HI-RES COMMUNICATIONS, INC. presents THE COLLINS VIDEO LIBRARY!

Highly detailed videos on operating, rebuilding, aligning & troubleshooting these classics!

**NEW! COLLINS R-390A VIDEO** • 7 hours • \$109.95

**NEW! COLLINS 75A-4 VIDEO** • 4 hours • \$89.95

**NEW! COLLINS KWS-1 VIDEO** • 2 hours • \$39.95

**COLLINS KWM-2 VIDEO** • 4 hours • \$89.95

**COLLINS 75S-3/32S-3 VIDEO** • 3.5 hours • \$74.95

**COLLINS 30L-1 VIDEO** • 1 hour • \$39.95

**COLLINS 30S-1 VIDEO** • 1 hour • \$39.95

**COLLINS AMATEUR RADIO EQUIPMENT VIDEO**

**SPOTTER'S GUIDE: KW-1, KWS-1, 30K-1, 20V-3, 75A-4, KWM-2, S/LINE, KWM-1, 30S-1, 30L-1, KWM-380 and much more!** • 1 hour 40 minutes • \$24.95

Purchase any three or more videos from the Collins Video Library qualifies you for a 10% package discount! Visa and Mastercard gladly accepted! For Mail orders, add \$4.50 each for the first two videos for shipping in the USA. Additional videos are shipped at no extra charge.

**HI-RES COMMUNICATIONS, INC.**

8232 Woodview Dr., Clarkston, MI 48348-3459

(248) 391-6660 (PHONE & FAX)

E-mail: [hi-res@rust.net](mailto:hi-res@rust.net) • <http://www.rustnet/~hi-res>

6 repeaters along with 5 other affiliated repeaters. It supports the Rutherford Co ARES and other non-profit organizations that may need assistance. MARC News, a publication of the MARC, features a column called, "How I Became a Ham." Very interesting reading, and maybe other clubs will consider such a column in their publications. Thanks to all RACK members who supported the MS Bike Tour. Zero Beat editor AC4QZ, is hoping to step down at the end of 1997 because of "burn-out." Someone please volunteer to accept this post, because we surely don't want this publication to stop. CARC has developed an Elmer concept as a club-sponsored activity. Various hams have volunteered to be the Elmer in their expertise. I think this is an excellent approach to teaching the different topics of ham radio. Net Sess/QT/CNI: TCWN 22/36/200; TEMPIN 20/22/571; TEPN 25/118/2571; TSCWN 20/7/62; Tfc: NZ4O 348, N4PU 98, WA4FMH 64, WA4HKU 50, WA4SQE 48, KA5KDB 41, WB4DJY 37, N4LA 34, WA4GLS 19, WA4HZD 14, K4TAX 8, K4YI 6, WD4EKA 5, W4PSN 4, W4IKK 2, KR4YI 1.

## GREAT LAKES DIVISION

**KENTUCKY:** SM: Bill Uschan, KC4MIS—ASM: Tom Lykins, WD4RWU. SEC: Craig Still, KD4PKW. ACC: John Embry, K4AT. PIC: Steve McCallum, W2ZBY. TC: Scotty Thompson, K4AT. STM: John Farler, K4AVX. SGL: Ron Landrum, K4MDX. BM, Ernie Pridmore, K4IVG. First I would like to welcome aboard Ernie Milton as the Kentucky Section's new Bulletin Manager. Guess the hamfests are over until Cincinnati in late February. On September 22, 1997, Amateur Radio lost one if its most avid supporters. Mr Al Severson, AB8P, became a SK. Mr Severson was a great man as far as this Section Manager is concerned and was a great loss to Amateur Radio. I want to take this opportunity to wish everyone and their families a Happy Thanksgiving. Soon it will be time for old Santa to make his appearance. From the information I received it looks like the SET that was held on October 4, 1997, went very well. I would like to take the opportunity to welcome the following Ham operators to ARES and Field appointments: Wendall Curry, K4JZ, EC for Calloway Co., Scott Thile, KU4GR, EC for Trigg Co. and an OES for Trigg Co.; Ron Ritchie, K4FOM, EC for Fayette Co.; Frank Kirby, K4ASH, OES for Trigg Co.; Bobby Mosley, K4AQO, OES for Rockcastle Co.; and finally Eddie Mosley, K4QWQ, also and OES for Rockcastle Co. Net/ONI/QT/CNI/Mgr. MKPN/1812/30/33/WD4RWU. KTN/1193/41/30/NA4FP. KEN/168/0/5/ K4DPW. CARN/406/89/29/KN4IV; TSTM/N/A/89/29/ KB8GWL. 4ARES/464/3/5/WA4RRR.KRN/591/22/21/ N4AEP. Tfc: K4AVX 52, N4GD 35, WA4HLW 10, N4LQ 4, K04OL 9, K4DPW 5, WB4ZDU 11.

**MICHIGAN:** SM: Dick Mondro, WA4FOT—ASM: Roger Edwards, WB8WJV@WB8WJV. ASM: John LaRock, K8XD. SEC: Deborah Kirkpatrick, KA8YKK. STM: Dale Cryderman, KA9EIZ @ W8EHH. ACC: Mike Pearsall, N8MP. OOC: Mark Drollias, N8IQX. PIC: Greg Ozimek, WB8FNQ. SGL: Ed Hude, WA8QJE. TC: Dave Smith, WB8YV. VHF/UHF Net Manager: Paul Harmer, KB2ZDV. Section Newsletter Editor: Dave Colangelo, KB8RJI. The weekend of October 4&5 was busy with SET 97 activity. I am proud of our NTS and ARES teams that displayed their operating skills in traffic handling and emergency procedures. My thanks to all participants for a great team effort. Please remember to check in to the Michigan Section ARPSC Net on 3.932 every Sunday afternoon at 5 PM local time for updates on what's happening in the section. Congratulations to the new officers of the Midland Amateur Radio Club. They are: President Eldon Hall, N8STB; VP Dorie French, N8WTO; Secretary Ruth Tallman, KC8FDM and Treasurer Larry Mackin, N8CPG. Congratulations also to the Hiawathaland Amateur Radio Associations recently elected officers. They are: President Rich, AD8U; VP Bruce, KG8YT; Treasurer Bill, N8NRG; Secretary Paul, N8XTB and Board Member Greg, K8AF. Good luck with all your club activities. Come out to the December 6, 10 AM meeting of the City of Detroit ARES team at the new midtown VA Hospital 4646 John R @ Canfield, Detroit 48201. Their speaker will be Assistant Section Manager for ARPSC Roger Edward, WB8WJV. Here is a great opportunity to attend a meeting in this beautiful new building with free parking in the deck (blue area) and hear about the ARES/NTS program from our Section Leadership. Everyone invited. We all get frustrated from time to time with things that just don't go our way in our associations with various clubs or organizations that we belong to, or people that we know. Rather than continuing to kindle the flames of destruction, let's all vow to forget the past that we cannot change, and look forward to the future with a positive attitude. You'll feel better about it because you have eliminated stress that is self defeating. Remember to treat others as you would like to be treated and perhaps bring a little joy into the lives of others and yourself. Every year when the Holiday Season comes around, I realize that the best gift that I receive each year is meeting folks, like all of you, throughout the year. May the spirit of the Holiday Season that forever endures, leave its richest blessings in the heart of YOU and YOURS. Happy Holidays and Peace to all. Dick, WA4FQT. HELP WANTED: A team player to take on responsibilities of "Bulletin Manager," a section-level volunteer appointment. Salary: Self satisfaction. Info: Please contact Michigan Section Manager listed on page 12, QST. September 1997 NTS Net Reports:

Net	QNI	OTC	Sess	NM	Freq	Time	Day
QMN	667	222	59	WB8BHQ	3.663	6:30-10 PM	Daily
MACS	381	65	28	WB8RNO	3.953	11 AM	Daily (1 PM Sun)
MITN	560	142	30	KA9EIZ	3.952	7 PM	Daily
UPN	1501	56	34	WA8DHB	3.921	5 PM	Daily (Noon Sun.)
GLETN	735	92	30	VE3SCY	3.932	9 PM	Daily
SEMTN	606	76	30	W1BK	145.330	10:15 PM	Daily
TATN	216	07	11	KC8GFX	147.300	9:30 PM	Daily
WSSBN	867	46	30	K8GOU	3.935	7 PM	Daily
VHF	512	34	81	WB8ZDV	Various		

Tfc. reports for September: KA9EIZ 146, WX8Y 107, WB8RTN 100, N8FPN 76, K8JN 72, W1BK 68, K8GFXV 62, K8BZY 57, WA8DHB 48, W8RNO 44, WA8JXG 41, N8TDE 40, K8UPE 30, K3UWV 26, WR8F 22, K8ZJU 18, AA8SN 16, N8OSC 16, K8LJG 13, W8YJZ 13, WB8WJV 8, K8CGMT 7, K4BLAR 6, WB8BGY 2.

**OHIO:** SM, David Kersten, N8AUH, @W8IZ (see p 12) or [kersten@irmg.com](mailto:kersten@irmg.com)—ASM: John Haungs, WA8STX 513-



# MFJ 300 Watt Roller Inductor Tuner

World's only 300 watt AirCore™ Roller Inductor Antenna Tuner gives you absolute minimum SWR... Covers 6 Meters thru 160 Meters... lighted Cross-Needle meter... tunes any antenna... 8 position antenna switch... dummy load... balun... 1 year No Matter What™ warranty

**Covers 6 Meters  
thru 160 Meters!**

MFJ-969

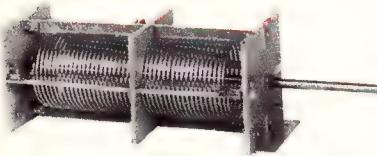
**\$189.95**

**Call your dealer for  
your best price!**

NEW MFJ-969 gives you MFJ's superb AirCore™ Roller Inductor and full 6 Meter thru 160 Meter coverage!

You get everything you've ever wanted including... 300 Watts PEP SSB full featured antenna tuner, widest matching range, lighted Cross-Needle SWR/Wattmeter reads true peak forward power, QRM-Free PreTune™, 8 position antenna switch, built-in 50-Ohm dummy load and heavy duty 4:1 balun -- all in a tough, scratch-proof cabinet.

**AirCore™ Roller Inductor**



MFJ-969's AirCore™ Roller Inductor, three-digit turns counter and spinner knob gives you exact inductance control for absolute minimum SWR.

MFJ's exclusive AirCore™ Roller Inductor has an air core that can't burn up! You get ultra high-Q, the lowest loss, highest efficiency and highest power handling of any roller inductor in ham radio.

MFJ's exclusive Self-Resonance Killer™

## MFJ-989C world famous 3 KW Antenna Tuner



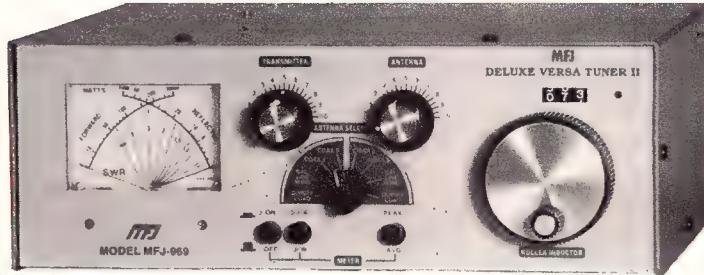
MFJ-989C **More hams use MFJ-989s  
\$349.95 than any other 3 KW antenna  
tuner in the world!**

The rugged MFJ-989C handles 3 KW PEP SSB and covers 1.8 to 30 MHz including all MARS and WARC bands.

Match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave -- nearly any antenna. Use coax or balanced lines.

MFJ's new AirCore™ Roller Inductor, three-digit turns counter and spinner knob gives you exact inductance control for absolute minimum SWR. It has an air core that can't burn up! An exclusive Self-Resonance Killer™ removes damaging self resonances.

**MFJ... the world's most trusted name in antenna tuners**



keeps potentially damaging self-resonances away from your operating frequency.

Large self-cleaning wiping contact gives you excellent low-resistance connection without contact arcing or burning.

Solid 1/4 inch brass shaft has self-align bearings for smooth non-binding operation.

### Covers 6 Meters thru 160 Meters

The MFJ-969 covers all frequencies from 6 Meters through 160 Meters, including the "magic band" -- the widest matching range of any full featured antenna tuner.

### Match any Antenna

You can match dipoles, verticals, inverted vees, random wires, beams, mobile whips, shortwave receiving antennas -- nearly any antenna. You can use coax cable or balanced feedlines. Has heavy duty 4:1 balun.

### Lighted Cross-Needle Meter

MFJ's lighted Cross-Needle Meter shows you SWR, forward and reflected power simultaneously. It reads true peak forward power and average power on 300 watt or 30 watt ranges.

Meter light has ON/OFF switch and requires 12 VDC or 110 VAC with optional MFJ-1312B, \$12.95.

### 8 Position Antenna Switch

MFJ's 8 position antenna switch lets you

select two coax fed antennas, random wire/balanced line or built-in dummy load for use through your MFJ-969 or direct to your rig.

### QRM-Free PreTune™

MFJ's QRM-Free PreTune™ lets you pre-tune your MFJ-969 off-the-air into a built-in dummy load without causing QRM.

Pre-tuning into a dummy load makes tuning your actual antenna faster and easier.

### Full Size Dummy Load

The MFJ-969 has a full size non-inductive 50 Ohm dummy load.

You'll find it handy for tuning, testing and repairing your rig, setting power level, adjusting your mic gain and more.

### Superior Cabinet

Each MFJ-969 cabinet has a new tough scratch-proof vinyl cladding. You won't find a tougher, longer lasting finish anywhere. Measures 3 1/2x10 1/2x9 1/2 inches.

### No Matter What™ Warranty

Every MFJ-969 is backed by MFJ's famous one year No Matter What™ unconditional warranty. That means we will repair or replace your MFJ-969 (at our option) no matter what for a full year.

**Call your dealer for your best price!**

## MFJ versatile 1.5 KW Tuner



MFJ-962D **\$249.95** Use your barefoot rig now and have capacity to add a 1.5 KW PEP SSB amplifier later! Lighted Cross-Needle SWR/Wattmeter. 6 position antenna switch, Teflon® wound balun, ceramic feedthru insulators for balanced lines. 1.8-30 MHz. 10 3/4x4 1/2x14 1/8 in.

### Free MFJ Catalog

Nearest dealer/Free Catalog... 800-647-1800

<http://www.mfjenterprises.com> FAX: (601) 323-6551  
•1 year unconditional warranty •30 day money back  
guarantee (less s/h) on orders from MFJ •Add s/h

### Our 25th Year!

**MFJ** MFJ ENTERPRISES, INC.  
P.O. Box 494, Miss. State, MS 39762  
(601) 323-5869; 8-4:30 CST, Mon-Fri  
Technical Help: (601) 323-0549  
E-Mail: [mfj@mfjenterprises.com](mailto:mfj@mfjenterprises.com)

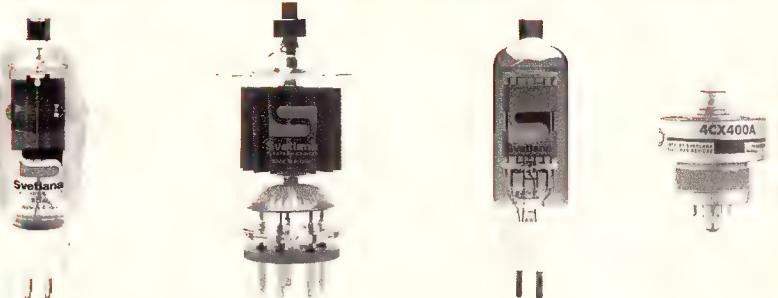
Prices and specifications subject to change. ©1997 MFJ Enterprises, Inc.



**Svetlana**  
ELECTRON DEVICES

Photos taken at our facility in St. Petersburg, Russia.

**Designed and manufactured to exacting standards,  
Svetlana Tubes are built rugged to last longer.**



[www.svetlana.com](http://www.svetlana.com)

Headquarters: 8200 S. Memorial Parkway • Huntsville, AL 35802 • Phone (205) 882-1344 • Fax (205) 880-8077  
Marketing & Engineering: 3000 Alpine Rd. • Portola Valley, CA 94028 • Phone (650) 233-0429 • Fax (650) 233-0439

**See these Svetlana Amateur Radio Tubes and more**



PACKET  
WEFAX  
AMTOR  
ASCII  
RTTY  
SSTV  
CW

**BayPac<sup>TM</sup>**  
**MultiMode**

Check It Out On The World Wide Web!  
<http://www.tigertronics.com>

SITOR A/B  
ARQ/FEC  
BAUDOT  
NAVTEX  
FAX480  
SYNOP  
More...

The best little packet modem just got better! Built on the tradition of the BP-1 Packet Modem, we are very proud to announce the BP-2 and BP-2M. The BP-2 is a new and improved version of our famous BP-1, while the BP-2M expands your horizons even further with MultiMode operation! So, whether you have been waiting to automate your CW, checkout AMTOR or just copy Weather Facsimile - Now is the time for you to jump in and join in all the fun!

**Tigertronics**  
INCORPORATED

Call Today! 1-800-8BAYPAC  
800-822-9722 (541) 474-6700 Fax 474-6703

Tigertronics, Inc. 400 Daily Ln. P.O. Box 5210 Grants Pass, Oregon 97527

BP-2 Packet Only \$49.95  
BP-2M MultiMode \$69.95  
+ \$5 Shipping & Handling



772-7378 or wa8stx@aol.com. ASM: Steve Wolf, W8IZ (Packet @W8IZ). SEC: Larry Solak, WD8MPV 330-274-8240. STM: Jack Wagoner, WB8FSV, fsv@network.com. ACC: Joanne Solak, KJ3O/8, 330-274-8240. BM: John Schlueter, W8WYH, @W8BI. TC: John Fakan, KB8MU. SGL: Paul Krugh, N2NS. @W8CQK. PIC: Beverly Priest, N8VZV, mapriest@erinet.com. OOC: Paul LaFollette, Jr. WB8ONA, wb8noa@worldnet.att.com. Dave's ASM scribe had to take over the September reports while Dave was traveling in Europe. PIC: Beverly Priest, N8VZV, presented the Ohio Section club newsletter contest winners. 1st place: DARA RF Carrier, Editor, Mike Priest, KB8JUA. 2nd place: Capital City ARC Columbus, Radiogram, Editor, Keith Chambers, KQ8H. 3rd place: Newark ARC Ham Chatter, Editor, Pete Rehner, KB8RJU. The Capital City Repeater Assn Columbus salutes William Tabor, N8NIO, as Mr Amateur Radio, one of its most dedicated workers. Thurman Chastain, WB8WZR, received the 1997 Distinguished Service Award by Dayton ARA for devoting 40 years to DARA in various capacities. Oh-Ky-In established the John Hugentober, N8FU, CW proficiency award to promote and instill proficiency in the art of CW in memory of N8FU, an amateur known throughout the world for his skill in CW. Tusco ARS Hamfest in Dover, OH, January 25. Mark your calendar for the Great Sakes Div in CA, Convention in Cincinnati, Feb 21-22. Cuyahoga Falls hamfest Feb 22.

Net	ONI	QTC	QTR	Sess	Time	Freq	NM
BN(E)	153	78	264	30	1845	3.577	WD8KFN
BN(L)	229	102	419	30	2200	3.577	N8V
BNR	120	44	900	29	1800	3.605	W7LQO
OSN	126	57	501	30	1810	3.708	WB8KQJ
OSSBN	1854	461	2061	90	1030	3.975	KF8DO
					1615,1845	3.972	

OH Section ARES net 1700 Sun 3.875 WD8MPV

Tfc: N8XF 270, KD8HB 165, WD8KFN 157, KAB8BN 140, KF8DO 137, W8PBX 135, K8DHD 129, N8CW 84, KB8VYB 79, N8FWA 75, K8OUA 71, WA8EYQ 66, N8EFB 66, WD8KBW 56, W8LDQ 55, K5WQO 55, N8DQ 48, WA8SS 47, NS8C 40, N8CX 35, W8VEK 34, N2NS 32, W8JLW 29, N8YXU 29, N8TNV 28, KB8RQD 27, K9D9 27, NY8V 25, K8MPD 24, N8VES 23, K8IG 22, KC8FUY 22, KB8TY 21, K180 19, KB9GGA18, N8UEO 17, W8AO 16, W8BO 16, KC8FWO 14, WB8FSV 12, K8BUEY 12, N8RNB 11, KF8E 11, K8WC 10, WB8KWD 10, W8GAC 10, KC4IYD 8, K8CEQA 6, AA8XS 5, WD8MIO 6, N8GOB 5, K8QIP 5, K8DXL 4, K8GOV 3, KC8HTP 3, W8GDQ 2, N8VET 1, (AG) N8VES 61.

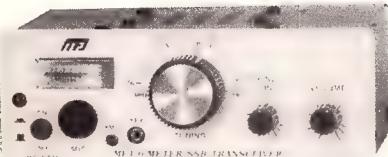
#### HUDSON DIVISION

EASTERN NEW YORK: SM: Rob Leiden, KR2L (@WA2UXM)— STM: Rick Warren, KF2YC. SEC: Tony Pazzola, WB2BEJ. ASM/ACC: Tom Raffaeli, WB2NHC. SGL: Phil Bradway, KB2HQ. PIC and BM: Steve Anderman, WA3RKB. OOC: Ha Post, AK2E. TC: Elmer Sharp, WA2YSM. ASM: Andrew Schmidt, N2FTR. ASM: Bob Chamberlain, N2KBC. ASM: Richard Sandell, WK6R. Net Reports (September 1997) Checkins (ONI) TESS handled (QTC-QSP): AESN: 49/6 CDN: 426/151 ESS 334/282 HVN: 582/148 NYP: 322/648 NYONP: 307/450 NYS/E: 316/366 NYS/L: 236/347 NYS/M: 196/222 CGESN 587/0 (1/1-9/30). The SET in ENY was a great success thanks to the many fine folks throughout the ENY Section who helped out. Special thanks go out to April Stack, KA2QIG, who did a great job of organizing several events on very short notice and to Tom, WB2NHC, Sandy N2SF, Alan, N2YKG, Joe, WB2VVS, and all the folks in WECA who executed the "Hurricane Sandy" drill. Special thanks also go out to Pete, N2YJZ, who expertly handled dozens of pieces of traffic on both HF and VHF during the SET and the many NCS who helped out on 75 M. I'd like to thank the new ENY Webmaster, John Czukermann, KB2WJG, for taking over the ENY Web Page from Keith, who did a great job in setting up and running the page. We will soon be relocating the ENY Web Page to a new site with more space and faster access. While on the subject, check out ASM Andrew Schmidt's new ENY event board. Be sure to e-mail him with your upcoming events. Happenings: The ENY staff has rescheduled its meeting to 12/6 in Suffern, due to scheduling conflicts. Are you planning your club's holiday party? It's a great opportunity to make new friends and have a great time! PSHR: N2YJZ, KF2YC, N2JBA, WB2IIV Tfc: N2YJZ 432, KF2YC 102, WB2IIV 67, N2JBA 58, WB2ZCM 34, N2AWI 19, 73, Rob.

NEW YORK CITY/LONG ISLAND: SM: Len Buonaiuto, KE2LE—ASM: KB2SCS. ASM: KD2YA. ACC: K2EJ. STM: WA2YOW. OOC: N2JX. PIC: N2RBU. TC: WY2U. BM: K2FD. SGL: W2UFO. LGL: KA2RGI/ Babylon. LGL: WA2KXE/ Long Beach, WB2MGP/ Staten Island. LGL: KB2TWO, Queens, LG.: N2HH, Oyster Bay. First, I would like to wish all a very happy holiday and healthy one. I would like to thank all who have supported us and our policy in the past year. The year has seen some good and some bad, however it will not stop us from keeping the NL1 section the very best in 1998. There were many changes in the past year and 98 holds more changes as well. All a must for a dedicated section manager and newly appointed staff members. A lot of jobs will be taken over by the new appointment of ASMs and the elimination of some old, out-dated positions. A closer and new group of staff members who share present administrations views and policy will be forthcoming. My deepest thanks go to KD2YA/ASM, N2NFI/DEC Suffolk county, WA2YOW/STM and many others who helped bring the truth and info to our section members. 1998 will be time for all interested in ARRL section positions to step forward and be seen and heard. We want to get the message to all hams to be a part of the ARRL and be responsible for building up our ranks. Again, have a happy holiday and let's enjoy our new gifts and rigs. NYC/L1 VE exam list as follows. VE sessions: Islip, ARS, 1st. Sat 9 AM, Islip Town Hall West 401 Main St. Islip, Addison Levy, KD2YA 516-234-0589; Bears VE: ABC Bldg Cafeteria, 125 West End Ave at 66th St, Call hotline 212-456-5224 for exact dates & times, Jerry Cudmore, K2JRC. Grumman ARC (W5YI) 2nd Tues 5 PM, Northrop-Grumman Plant, 5 S Oyster Bay Rd via Hazel St, Bethpage, NY. Bob Wexelbaum, W2ILP, 516-499-2214, LIMARC, 2nd Sat, 9 AM, NY Inst of Tech, 400 bldg, rm 409, Northern Blvd, Old Westbury, Al Bender, W2QZ, 516-623-6449; Gallups Island RA, 3rd Sat, 1 PM, USMMA, Bowditch Hall, Steam-

# MFJ 6 Meter SSB Adventure Radio™

Incredibly low \$249.95... for No-code Techs and Veterans alike... Explore the world... Ragchew with locals... 10 Watts Out... Super Hot Receiver...



MFJ-9406  
**\$249.95**

Work exciting 6 Meter DX from all over the world on ham radio's "magic band"!

It's an adventure every time you turn on your MFJ-9406 six meter SSB transceiver.

Distant stations come rolling in loud and clear with crystal clear armchair copy. You'll have fun exploring exotic 50 MHz band openings -- Tropo, Sporadic E, F2, TE, Aurora, Meteor Scatter, and more.

Ragchew with locals, hunt down new grid squares from far-away places from home, car or mountain top.

**Special Offer! MFJ-9406X, \$259.95!**

Includes MFJ-9406 & MFJ-290 microphone.

*Here's what you get...*

**Full SSB/CW coverage:** 50.0-50.3 MHz covers SSB, CW, propagation beacons.

**Potent signal:** 10 Watts PEP output.

MFJ's exclusive *Constant-Current™* syllabic speech processing gives you up to 6 dB more punch to cut thru noise, fading, QRM.

**Hot receiver:** Crystal-mixed single-conversion superhet with low-noise preamp digs deep into the noise to capture weak signals. If a station is there, you'll hear it!

**Easy to operate:** No microprocessor mumbo-jumbo... just turn on and tune in.

**Low power drain:** Mountain-top all day on lightweight NiCads or operate from home

on 110 VAC with MFJ-4110, \$39.95.

**Excellent selectivity:** Sharp HF proven SSB crystal ladder filter reduces QRM and passband noise.

**TVI protection:** Seven element low-pass filter knocks out TVI -- lets you operate when you want to!

**Real S-meter:** Give meaningful signal reports, accurately steer your beam, monitor speech processing.

**Smooth tuning:** Vernier reduction drive makes tuning precise and easy.

**External amplifier:** Jack provides a key-line for activating 6 Meter SSB amps.

**Built to last:** Premium PC board, quality components, brushed-aluminum panel and tough vinyl-clad case gives years of service.

**Compact:** At only 2 1/2x6 1/2x6 inches, the MFJ-9406 fits in just about anywhere.

**Fully guaranteed:** MFJ's exclusive one-year *No Matter What™* warranty. We will repair or replace (at our option) your MFJ-9406, no matter what happens, for 1 full year.

## MFJ-9406 Accessories

**Handheld dynamic SSB microphone:**

Specially matched to compliment the *Constant Current™* speech processor used in the MFJ-9406. **MFJ-290, \$29.95.**

**CW Module:** Install this and operate CW -- a must for DXers. Provides semi-QSK break-in and sidetone. **MFJ-416, \$39.95.**

**Power Supply:** Heavy duty wall transformer and voltage regulator delivers 13.8 VDC for MFJ-9406. Powerful, yet small. Fits in your coat pocket! **MFJ-4110, \$39.95.**

**Portable Battery/AC Power Pack:** Use Ni-Cad, Alkaline, regular D cells or 110 VAC. Charges Ni-Cads. Fastens to MFJ-9406. Batteries not included. **MFJ-4112, \$69.95.**

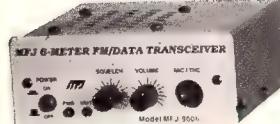
## MFJ 6 Meter FM Communicator™ Transceiver

MFJ-9606

**\$149.95**

MFJ-9606X  
\$159.95 with Mic

The MFJ-9606 FM Communicator™ is the most inexpensive way to get on 6 Meter FM Voice or Packet! 10 Watt



## 6 Meter MFJ Antenna Tuners

### Compact 6 Meter Antenna Tuners

MFJ-906, \$79.95. Lighted 2 Range Cross-Needle SWR/Wattmeter, bypass switch. 100 watts FM, 200 Watts SSB PEP. 8x2 1/2x3 inches.

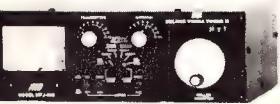
MFJ-903, \$49.95. Like MFJ-906, no meter, bypass switch. 5x2 1/2x3".

### Mobile 6 Meter Antenna Tuner

MFJ-945E, \$99.95. Compact mobile tuner covers 6 Meters thru 160 Meters. Lighted Cross-Needle SWR/Wattmeter. Antenna bypass switch. 300 Watts PEP SSB. 8x2x6". Mobile mount, MFJ-20, \$4.95.

### Roller Inductor Antenna Tuner covers 6 Meter thru 160 Meters!

MFJ-969, \$179.95. MFJ-969 has MFJ's superb *AirCore™* Roller inductor, *continuous* 6 Meter - 160 Meters coverage and *QRM-Free PreTune™*! Wide matching range, lighted Cross-Needle SWR/Wattmeter, 8 position antenna switch, dummy load, 4:1 balun., 300 Watts PEP SSB. 3 1/2x10 1/2x9 1/2".



**MFJ... the world leader in ham radio accessories!**



MIRAGE  
A-1015-G  
**\$389**

Suggested Retail  
Call your favorite  
dealer for your  
best price!

Power Curve -- typical A-1015-G output power for your HT input

Watts Out	6	22	42	63	84	98	122	142	150
Watts In	.25	1	2	3	4	5	7	9	10

Work exotic 6 Meter DX with 150 Watts of brute power! The A-1015-G is the world's most popular all mode FM/SSB/CW 6 Meter amplifier. Ideal for 1 to 15 Watt mobile, home or handheld rigs. 150 Watts out with just 10 Watts in. Extra heavy duty heatsink spans length of cabinet. Draws 18-22 amps at 13.8 VDC. 12x3x5 1/2 in.

Free Catalog/Nearest Dealer 800-647-1800  
Tech: (601) 323-8287 Fax: (601) 323-6551

**MIRAGE**  
COMMUNICATIONS EQUIPMENT  
300 Industrial Park Road, Starkville, MS 39759  
... the world's most rugged VHF/UHF Amplifiers!

## 6 Meter Antennas

### MFJ 3 element 6 Meter Yagi

MFJ's MFJ-1762

**\$69.95**

6 Meter Yagi

quadruples your effective radiated power over a half-wave dipole. 6 foot boom. 2 pounds. Can use TV rotator and mast. Handles 300 Watts PEP SSB. Mounts vertically or horizontally. Current balun decouples feedline. Excellent front-to-back ratio.

### MFJ full halfwave 6 Meter Antenna

MFJ's full halfwave

MFJ-1764

6 Meter centered antenna **\$44.95**

has excellent bandwidth and low angle radiation for super DXing! Mounts vertically for FM/Packet or horizontally for SSB. Ferrite choke balun decouples feedline, shunt choke bleeds off static. Strong lightweight aluminum. Two 47" radiators, 23" boom. 1 1/2 pounds. On 2 Meters you get 2 stacked 5/8 wave radiators for twice the gain of a single 5/8 wave!

### MFJ 6 Meter folded dipole

MFJ's efficient low SWR

folded dipole is light-

MFJ-1776

weight, easy-to-carry,

\$34.95

easy-to-set up. Perfect for

MFJ-9406 and other 6 Meter rigs.



### MFJ Dual Band 6/2 Meter Mobile

On 6 Meters, it's a high

MFJ-1728B

performance full quarter

**\$24.95**

wave mobile magnet mount antenna. On 2 Meters, it's a maximum gain 5/8 wave antenna. Low SWR, handles 300 Watts PEP, heavy duty magnet, 12 feet coax, free BNC adapter for handhelds.



transmitter, *CrystalClearVoice™* puts the fun and fidelity back into ham radio with true-to-life speech quality and ultra-clean AFSK data signals. *Super fast* PIN diode switching, no compromise dual-conversion FM receiver with quiet LNA, factory installed 52.525 MHz calling frequency crystals. Additional plug-in crystals, \$24.95 per frequency.

## Free MFJ Catalog

Nearest Dealer... 800-647-1800

• 1 year unconditional warranty • 30 day Money Back guarantee (less s/h) on orders from MFJ • Add s/h

**MFJ** MFJ ENTERPRISES, INC.

P.O. Box 494,

Mississippi State, MS 39762

Prices/Specs subject to change. ©1997 MFJ Inc.

• MAIN 601-323-5869 • FAX 601-323-6551 • TECH 601-323-0549

• Call 8-4:30 CST, Mon-Fri • E-Mail: [mfj@mfjenterprises.com](mailto:mfj@mfjenterprises.com)

Web Site: <http://www.mfjenterprises.com>

# 800-244-4567

"Where the hard to find parts are found,  
and on hand"



Surplus Sales of Nebraska has a huge stock of doorknob capacitors available. Repair your **BUTTERNUT** Vertical today!



## - AIR VARIABLE - HEADQUARTERS

See Pages 74-78 of CATALOG 8 For more Air Variables!!

	Each	(3+)
CAV-154-11-1	9.38pf@4kv (.125" Plate Spacing)	\$42 \$39
CAV-12-23	9.110pf@4kv (.125" Plate Spacing)	\$49 \$45
CAV-12-53	36-249pf@4kv (.125" Plate Spacing)	\$65 \$62
CAV-75-37	23-259pf@2.5kv (.075" Plate Spacing)	\$52 \$49
CAV-10-57	25-310pf@3.3kv (.1" Plate Spacing)	\$62 \$58
CAV-154-3-1	25-500pf@4kv (.045" Plate Spacing)	\$55 \$52
CAV-32-65	45-1000pf@1200V (.032" Plate Spacing)	\$69 \$65



### \* FERRITE SPLIT BEADS \*

Suppresses: Radio Interference, EMI Surges & Protects Against: Lightning Surges On Communication coax, data & telephone cables.

**SAVE BIG BUCKS!!**

	Each	(54-57)
#264-2882031	# 2311 D 52.50pf (6-24) \$2.25 (25-99) \$2.00 (100-249) \$1.75	
#264-3164351	# 3751 D 52.50pf (6-24) \$2.25 (25-99) \$2.00 (100-249) \$1.75	
#264-316151	# 51 D 55.50pf (6-24) \$5.00 (25-99) \$4.50 (100-249) \$4.25	
#264-3168651	# 2 51*1 D. \$11.00/box (6-24) \$10.00 (25-99) \$9.50 (100+) \$9.00	

#1. Includes plastic snap-sleeve for easy installation.

#2. Includes ty-wraps to join halves.

**COLLINS KWM-2/A MANUALS** - See Page 360 of CATALOG 8  
Most complete manual, 9th Edition, 15 January 1978. Includes complete fold out diagrams, revisions from KWM-2 to latest Rockwell KWM-2A.

**NEW Low Price \$25 each**

[www.surplussales.com](http://www.surplussales.com) • e-mail: [grinnell@surplussales.com](mailto:grinnell@surplussales.com)

to order call 1-800-244-4567

**1502 Jones St. • Omaha, NE 68102**  
TECHNICAL/CUSTOMER SERVICE CALL OR FAX:  
(402) 346-4750 • Fax (402) 346-2939

# CATALOG 8

Order Your Copy Today!



**\$5.00 (U.S.)**

**\$10.00 (International)**

**\$5 Rebate on 1st order from Catalog 8.**

**FREE with any order of \$25 or more!**

## FULL LINE OF SGC PRODUCTS

Visit our on-line Catalog at  
[www.surplussales.com](http://www.surplussales.com)

You won't find a wider variety of parts on any other web site!

boat Rd Kings Point, NY, Les Rauber, AA2E, 516-922-0947. Great South Bay ARC 4th Sun 12PM, Babylon Town Hall, ARES/RACES RM 200, E Sunrise Hwy. N Lindenhurst, Tom Carrubba, KA2DFO, 516-422-9684; Hellenic ARA: 4th Tues 6:30 PM, Pontion Society, 31-25 23rd Ave, Astoria, NY, George Anastasiadis, KF2PG, 516-937-0775; Larkfield ARC: 3rd Sat 9 AM, Huntington Town Hall, 100 Main St. Huntington, NY, Joe Coffield, W2DDZ, 516-266-3192; Columbia U VE Team: 3rd Mon 6:30 PM, Watson Lab 6th floor 612 W 115th St NY, Alan Crosswell, N2YKG, 212-854-3754; PARC: exams held every three months at Southold School Oaklawn Ave, Southold, NY on next to last Friday of the month 6:30 PM, all classes of licenses. For info, contact Ralph Williams/N3BT, 516-323-3646. Report all changes to KE2LE before 12th of the month. Tfc: KA2VZ 829, WB2GTG 150, N2AKZ 128, N2WGF 100, KB2WYE 96, KB2KLH 71, N2XOJ 67, KB2GEK 56, NB2D 28, WA2YOW 28, AA2NX 20, KC2ACL 18, N2MMZ 16, WA2VZ 2.

**NORTHERN NEW JERSEY:** SM, Roy H. Edwards, Sr., AB2RE, AB2RE@AB2RE-4, e-mail: AB2RE@arrl.org—ASM: KB2CMF, ASM: OOC KB2JSG, ASM: N2WZB, NJN Webmaster. Volunteer Counsel/N2IOB, BM: N2LXM, SEC: KB2WNZ, STM: WB2FTX, PIC: N2TPP. My first thoughts for this column are concerning the section OOC Marty Goldfarb, KB2JSG. Marty is currently recovering from some cardiac problems. I am sure I am speaking for the membership of the section as well as many others as I wish you, Marty, a speedy recovery. Marty is doing a great job in his position improving the effectiveness of the Amateur Auxiliary in our section. Marty has begun networking with surrounding counterparts and exchanging ideas and reports. He has recently spoken at club meetings explaining the responsibilities and duties of his position and those of an OO. His words have reached some interested Amateurs who have demonstrated a desire to help serve the radio community by requesting the needed study materials to prepare them for the OO test. If you have any questions or requests of Marty you may contact him at "MAGJSG@juno.com". I would like to thank the Chatham RACES organization, the Tri County Club and the New Providence Club for being such great hosts and inviting me to share some time and ideas. A special thanks is due the Rutgers' Amateur Radio Club and its advisors for assistance in providing a place for a group concerned with Local Repeater coordination to meet and prepare as needed to incorporate. I hope to be able to report more advances in this area in the near future. Another recent highlight for the hobby was provided by Brian Boccardi, N2MPM, who was an invited speaker at the Middlesex College October Computerfest. Brian's topic was "Amateur Radio's involvement with computers." As part of his presentation, he along with Paul Toth, KB2WNZ, SEC, gave the audience a live APRS demonstration. Paul, along with other League-minded amateurs, also hosted an ARRL booth at the exhibit for the entire two days. Dave Stroebel, WB2FTX, reports that Kathleen Kazakwic, N2KZJ, has passed along the Net Manager position to Carl Lee, W2PTZ. Kathleen, it appears, is moving to Colorado. Good luck and many thanks, Kate. Hope to continue to visit with you via the airwaves. Many thanks to Carl whose experience and expertise will continue to benefit the Net. Another NTS active operator is Stew Tannahill, KB2VVB, who is to be congratulated for his appointment as an Official Relay Station. The annual Traffic Handlers' Confab is scheduled for Saturday, December 6 at the College of New Jersey in the Trenton Area. Sept 1997 NJ Section Traffic Manager Report

Net	Mgr	Time	Freq	Sess	QNI	QTC
NJM	WA2OPY	1000	3695	30	246	89
NJPN	W2CC	1800	3950	34	215	30
NJSN	AA2HJ	1830	3715	30	168	9
NJN/E	AG2R	1900	3695	30	258	112
NJN/L	WA2SEI	2200	3695	30	175	29
CJTN	N3RB	2000	147.120	30	413	51
NJVN/E	N2ZKJ	1930	146.895		no report	
NJVN/L	N2OPJ	2230	146.490	30	220	53

Digital NTS activity: WB2FTX-4 packet/NTS hub 411 messages 2RN HF Digital NTS station: Originated 2 NTS, Received 83 NTS, forwarded 62 NTS. Tfc/PSHR: NJX 146/132, N2OPJ 127/170, W2MTO 113/110, N2QAE 70/33, WA2SEI 54/142, N3RB 42/40, N2GJ 40/10, N2VQA 38/118, W2JG, 34/124, K2VX 29/63, AB2RE 26/156, W2CC 21/81, N2RPI 15/141, W2PTZ 10/—, N2TTT 10/35, WB2CZW 6/90, 73 de AB2RE.

## MIDWEST DIVISION

**IOWA:** SM, Jim Lasley, N0JL @ KE0BX—ASM: N0LDD, SEC: N0AR. ACC: N0IJP @ KE0BX. BM: K0IR @ W0CXX. SGL: K0KD. TC: W0DIA. Ottumwa did the Oktoberfest parade again. Pretty much the usual bunch doing the usual thing. It went very well, but new blood is always nice. Good job gang. I notice several IA calls in the FD results again this year. Also notice some missing. CAARC has new officers, N0ZAK, KB0YVK, KA0RHZ, and N0YEE is on the board. FMARC has new ones too. N0NP, WB0B, and KA0YAP Congrats. CVARC is looking for a public service coordinator. If you are in the CR area and want to help, give 'em a call. Great pay, too. Mason City had a chili supper with lots left over (a tablespoon!). The QCATV club had a hidden XMTR hunt. Could the XMTR see them coming? ACRS has a reprint from the ARRL website on lightning. Take a look. Lots of public service listed this month. DARC did the fire cracker run, DMRAA reports on the MS150, SARA did an airshow and reports on a traffic accident in Sooland. CIRAS did the October parade. CIRAS also reports a code class on the 147.135 repeater. Winter is a good time to upgrade. LDD is working on Advanced and YMO is striving for General. Can't get the rest interested—yet. Sorry I didn't make it to DSM for the hamfest. I was in Denver. Truly need an STM. I need someone who can collect reports on SSB from both individuals as well as local nets. I will also give you a traffic count to report to the SMI! If I missed your activity, call and yell! I apologize in advance. This has been a very hectic month. Use a mode you haven't been using! Newsletters were received from OARC, CAARC, CVARC, FMARC, NIARC, DRAC, ACRS, DARA, DMRAA, CIRAS, IIARC Traffic: W0SS 138, N0JL 31.

# 800-244-4567

"Where the hard to find parts are found, and on hand"



Surplus Sales of Nebraska has a huge stock of doorknob capacitors available. Repair your **BUTTERNUT** Vertical today!



## - AIR VARIABLE - HEADQUARTERS

See Pages 74-78 of CATALOG 8 For more Air Variables!!

	Each	(3+)
CAV-154-11-1	9.38pf@4kv (.125" Plate Spacing)	\$42 \$39
CAV-12-23	9.110pf@4kv (.125" Plate Spacing)	\$49 \$45
CAV-12-53	36-249pf@4kv (.125" Plate Spacing)	\$65 \$62
CAV-75-37	23-259pf@2.5kv (.075" Plate Spacing)	\$52 \$49
CAV-10-57	25-310pf@3.3kv (.1" Plate Spacing)	\$62 \$58
CAV-154-3-1	25-500pf@4kv (.045" Plate Spacing)	\$55 \$52
CAV-32-65	45-1000pf@1200V (.032" Plate Spacing)	\$69 \$65



### \* FERRITE SPLIT BEADS \*

Suppresses: Radio Interference, EMI Surges & Protects Against: Lightning Surges On Communication coax, data & telephone cables.

**SAVE BIG BUCKS!!**

	Each	(54-57)
#264-2882031	# 2311 D 52.50pf (6-24) \$2.25 (25-99) \$2.00 (100-249) \$1.75	
#264-3164351	# 3751 D 52.50pf (6-24) \$2.25 (25-99) \$2.00 (100-249) \$1.75	
#264-316151	# 51 D 55.50pf (6-24) \$5.00 (25-99) \$4.50 (100-249) \$4.25	

#1. Includes plastic snap-sleeve for easy installation.

#2. Includes ty-wraps to join halves.

**COLLINS KWM-2/A MANUALS** - See Page 360 of CATALOG 8  
Most complete manual, 9th Edition, 15 January 1978. Includes complete fold out diagrams, revisions from KWM-2 to latest Rockwell KWM-2A.

**NEW Low Price \$25 each**

[www.surplussales.com](http://www.surplussales.com) • e-mail: [grinnell@surplussales.com](mailto:grinnell@surplussales.com)

to order call 1-800-244-4567

**1502 Jones St. • Omaha, NE 68102**  
TECHNICAL/CUSTOMER SERVICE CALL OR FAX:  
(402) 346-4750 • Fax (402) 346-2939

# Gunnplexers & accessories

10 & 24 GHz



A. M/A-COM 10 GHz Gunnplexer. Two of these transceivers can form the heart of a 10 GHz communication system for voice, mcw, video or data transmission, not to mention mountaintop DXing! MA87127-1 (10 mW transceiver) and MA86551 (horn antenna) \$185.60. Higher power units (up to 100 mW) available. B. M/A-COM 24 GHz Gunnplexer. Similar characteristics to 10 GHz unit. MA87820 (20 mW transceiver) \$369.60. C. This support module is designed for use with the MA87127 and MA87820 and provides all of the circuitry for an audio transceive system. The board contains a low-noise, 30-MHz fm receiver, modulators for voice and mcw operation, Gunn diode regulator and varactor supply. Meter outputs are provided for monitoring received signal levels, discriminator output and varactor tuning voltage. RXMR30VDA assembled and tested \$139.95. D. Complete, ready to use communication system for voice or mcw operation. Ideal for repeater linking. A power supply capable of delivering 13 volts dc at 250 mA (for a 10 mW version), microphone, and headphone and/or loudspeaker are the only additional items needed for operation. The Gunnplexer can be removed for remote mounting to a tower or 2 or 4 foot parabolic antenna. TR10GA (10 GHz, 10 mW) \$499.95. Higher power units available. TR24GA (24 GHz, 20 mW) \$699.95. Also available: horn, 2 and 4 foot parabolic antennas, Gunn, varactor and defector diodes, search and lock systems, oscillator modules, waveguide, flanges, etc. Call or write for additional information. Let ARR take you higher with quality 10 and 24 GHz equipment!

**Advanced  
Receiver  
Research**

Box 1242 • Burlington CT 06013 • 860 485-0310



# MFJ tunable super DSP filter

Only MFJ gives you tunable and programmable "brick wall" DSP filters

MFJ's tunable super DSP filter automatically eliminates heterodynes, reduces noise and interference simultaneously on SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX, weak signal VHF, EME, satellite.

You get MFJ's tunable FIR linear phase filters that minimize ringing, prevent data errors and have "brick wall" filter response with up to 57dB attenuation 75 Hz away.

Only MFJ gives you 5 tunable DSP filters. You can tune each lowpass, highpass, notch, and bandpass filter including optimized SSB and CW filters. You can vary the bandwidth to pinpoint and eliminate interference.

Only MFJ gives you 5 factory pre-set filters and 10 programmable pre-set filters that you can customize. Instantly remove QRM with a turn of a switch!

MFJ's automatic notch filter searches for and eliminates multiple heterodynes.

You also get MFJ's advanced adaptive noise reduction. It silences background noise and QRM so much that SSB signals sound like FM.

The automatic notch and adaptive noise reduction can be used with all relevant tunable pre-set filters.

Automatic gain control (AGC) keeps audio level constant during signal fade.

## Tunable bandpass filters

Narrow band signals like CW and RTTY jump out of QRM when you switch in MFJ's exclusive tunable FIR bandpass filters.

You can tune the center frequency from 300 to 3400 Hz, and vary the bandwidth from 30 Hz to 2100 Hz -- from super-tight CW filters to wide razor-sharp Data filters.

You can use two tunable filters together. For example, tune one to mark, one to space and set bandwidth tight for a super sharp RTTY filter.

## Tunable highpass/lowpass filters

You can tune the lower cutoff frequency 200 to 2200 Hz and the upper cutoff frequency 1400 to

U.S. Patent D374,010  
MFJ-784B

**\$249.95**

**NEW!**



3400 Hz. This lets you create custom filters for Voice, Data and other modes.

Signals just 75 Hz away literally disappear -- they are reduced 57 dB!

## Automatic notch filter

MFJ's automatic notch filter searches for and eliminates multiple heterodynes in milli-seconds. It's so fast, that even interfering CW and RTTY signals can also be eliminated.

You can selectively remove unwanted tones using the two manually tunable notch filters -- an MFJ exclusive. Knock out unwanted CW stations while you're on CW.

## Adaptive Noise Reduction

Noise reduction works in all filter modes and on all random noise -- white noise, static, impulse, ignition noise, power line noise, hiss.

The LMS algorithm gives you up to 20 dB of noise reduction. Noise reduction is adjustable to prevent signal distortion.

## 15 pre-set filters -- factory set or you custom program

You can select from 15 pre-set filters. Use for SSB, AM, CW, packet, AMTOR, PACTOR, RTTY, SSTV, WeFAX, FAX or any mode.

If you don't like our pre-set filters, you can program your own -- an MFJ exclusive! Save center frequency/bandwidth, lowpass/highpass cutoffs, auto/manual notch, noise reduction -- all filter settings -- in 10 programmable filters.

## Plus more . . .

A push-button bypasses your filter -- lets you hear the entire unfiltered signal.

2 1/2 watt amplifier, volume control, input

level control, speaker jack, PTT sense line, line level output. 9 1/2 x 2 1/2 x 6 inches.

Plugs between your transceiver or receiver and external speaker or headphones. Use 12 VDC or 110 VAC with MFJ-1315, \$14.95. Cable Pack, MFJ-5184, \$7.95, includes receiver cable, DC cable, 2 open-end TNC cables.

## New Features

MFJ's exclusive tunable Spotting Tone™ -- accurately tunes even the narrowest CW filter.

MFJ's exclusive Adaptive Tuning™ -- tuning rate automatically becomes finer as you narrow bandwidth -- makes narrow filters easy-to-use.

MFJ's exclusive FilterTalk™ -- sends precise filter settings in Morse code.

Has automatic notch with variable aggressiveness, new quieter 2 1/2 watt audio amplifier, new speaker switch keeps phones always active.

Manual and automatic notch can be used together. Noise reduction, automatic notch and tunable manual notch can be used when a custom filter you saved in memory is selected.

You get an accurate easy-to-use input level indicator, improved manual notch in the CW mode, adjustable line level output, more Mark-Space frequencies and baud rates for data filters and auto-matic bypass during transmit for monitoring CW sidetone, voice or data by sensing the PTT line.

## Firmware Upgrade

For MFJ-784, order MFJ-55, \$29.95. Gives you most features of the MFJ-784B.

## 60 dB Null wipes out noise and interference

at a push of a button.

Easy-to-use! Plugs between transmitting antenna and transceiver. To null, adjust amplitude and phase controls for minimum S-meter reading or lowest noise. To peak, push reverse button. Use built-in active antenna or an external one. MFJ's exclusive Constant Amplitude Phase Control™ makes nulling easy.

RF sense T/R switch automatically bypasses your transceiver when you transmit. Adjustable delay time. Uses 12 VDC or 110 VAC with MFJ-1312B, \$12.95. 6 1/2 x 1 1/2 x 6 1/4 inches.

**MFJ-1025, \$139.95.** Like MFJ-1026 less built-in active antenna, use external antenna.

**NEW! 60 dB Null wipes out noise and interference**

MFJ-1026  
**\$159.95**



Wipe out noise and interference before it gets into your receiver with a 60 dB null!

Eliminate all types of noise -- severe power line noise from arcing transformers and insulators, fluorescent lamps, light dimmers, touch controlled lamps, computers, TV birdies,

## Add DSP to any Multimode

Add "brick wall" DSP filtering to any TNC or multi-mode data controller.

Copy signals buried in noise and QRM.

Under severe QRM,

DSP greatly improves copy of Packet, AMTOR, PACTOR, GTOR, Clover, RTTY, SSTV, WeFAX, FAX, CW -- nearly any digital mode. Automatic gain control, ON/OFF/Bypass switch. Plugs between transceiver and multi-mode. Uses 10-16 VDC or 110 VAC with MFJ-1312B, \$12.95. 4 1/2 x 2 1/2 x 5in.

## DSP for your MFJ-1278/B

MFJ-780  
**\$99.95**



Plug a MFJ-780 "brick wall" DSP filter into your MFJ-1278/B multi-mode and you won't believe your eyes when you see solid copy from signals completely buried in QRM! MFJ-1278/B automatically selects the correct DSP filter for Packet, AMTOR, Pactor, RTTY, ASCII, FAX, Color SSTV, Navtex or CW.

Plug in a MFJ-780 and copy signals that other multi-modes can't. Some soldering needed.

## Free MFJ Catalog

Nearest Dealer . . . 800-647-1800

• 1 year unconditional warranty • 30 day Money Back guarantee (less s/h) on orders from MFJ • Add s/h

**MFJ**

MFJ ENTERPRISES, INC.

P.O. Box 494

Mississippi State, MS 39762

Prices and specifications subject to change. © 1997 MFJ Inc.

• MAIN 601-323-5869 • FAX 601-323-6551 • TECH 601-323-0549  
• Call 8-4:30 CST, Mon-Fri • E-Mail: [mfj@mfjenterprises.com](mailto:mfj@mfjenterprises.com)

Web Site: <http://www.mfjenterprises.com>

**MFJ . . . the world leader in ham radio accessories!**

## SWR/POWER METER



Actual size  
4-1/4x4-1/4x2-1/4 in.

- Shows PEP instantly, accurately.
- Shows SWR while you talk.
- Automatic. No "Cal" control.
- 20,200,000 watt ranges. 1.7-30 MHz.
- For 12-v DC or use AC adapter.

Model M-840 ..... \$199.95  
Model P-95 AC Adapter ..... \$15.00  
+ \$6 S&H U.S./Canada. Tax in Calif.

## TOROID CORES



Palomar stocks ferrite and iron powder cores. Catalog free. Free RFI Tip Sheet tells how to get RFI out of TVs, telephones, stereo, etc. Our handy RFI kit fixes most household problems.

Model RFI-4 ..... \$25.00  
+ \$6 S&H U.S./Canada. Tax in Calif.



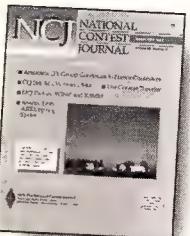
send for FREE catalog



**PALOMAR**

BOX 462222, ECONDIDO, CA 92046  
TEL: 760-747-3343 FAX: 760-747-3346  
e-mail: [Palomar@compuserve.com](mailto:Palomar@compuserve.com)

## Are You Ready for Contest Season?



Isn't it about time for NCJ, the **National Contest Journal**?

For just \$12 per year, each bi-monthly issue contains:

- Articles by top contesters
- Interesting letters and opinions
- Contest hints
- Scores & statistics
- NA Sprint & QSO parties
- Profiles of top contesters

\$12 US, Canada & Mexico by first class mail \$20, elsewhere by surface mail \$22; airmail \$30.

### The American Radio Relay League

phone: 888-277-5289 (toll-free) • fax: 860-594-0303  
225 Main Street, Newington, CT 06111  
email: [pubsales@arrl.org](mailto:pubsales@arrl.org)  
<http://www.arrl.org/>

# WARNING!

## Save your life or an injury

Base plates, flat roof mounts, hinged bases, hinged sections, etc., are not intended to support the weight of a single man. Accidents have occurred because individuals assume situations are safe when they are not.

Installation and dismantling of towers is dangerous and temporary steel guys of sufficient strength and size should be used at all times when individuals are climbing towers during all types of installations or dismantlings. Temporary steel guys should be used on the first 10' of a tower during erection or dismantling. Dismantling can even be more dangerous since the condition of the tower, guys, anchors and/or roof in many cases is unknown.

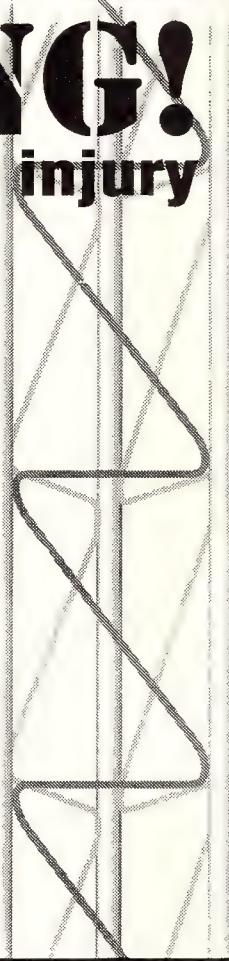
The dismantling of some towers should be done with the use of a crane in order to minimize the possibility of member, guy, anchor or base failures. Used towers are not as inexpensive as you may think if you are injured or killed.

Get professional, experienced help and read your Rohn catalog or other tower manufacturers' catalogs before erecting or dismantling any tower. A consultation with your local professional tower erector would be very inexpensive insurance.

Paid for by: **ROHN**

P.O. Box 2000, Peoria, Illinois 61656

**American Radio Relay League**  
225 Main Street, Newington, CT 06111



**KANSAS:** SM, Mike Brungardt, K0TQ—SEC: Joe Plankinton, WD0DMV. STM/ASM: Orlan Cook, W0OYH. ACC/OCC: Bob Summers, K0BXF. SGL: Marshall Reese, AA0L. Joe, WD0DMV, reported at the section meeting during the convention this year of a very small number of reports from the districts in the state. Joe works with the state and is often asked of amateur operators in different areas of the state and is unsure of a lot of his information. This is vital information that must be kept up to date for very quick reference. I urge all DECs to collect any kind of a report from your ECs and get them sent to Joe. Even if the only activity to report is the usual nets, please get those reports in. My first few months of being section manager began in October of last year and has been a very interesting, joyful and learning experience. Now it looks that my work may require us to relocate to a new QTH. Nothing definite yet, but if we quickly disappear this will be the reason. When this happens, I will ask my assistant Orlan, W0OYH, to take over for a short time pending further plans. If things do not work out with the job, then we'll look forward to a very prosperous new year with hopefully more organization and more frequent meetings within our section. I've really enjoyed working and meeting all of the hams we have here in Kansas. Until next month, the very best of 73 de K0TQ, SM, TIC: WOYH 128, WB0ZNY 103, K0RY 36, KB0DTI 26, KX0I 24, W0FT 20, K0TQ 11, NB0Z 5.

**MISSOURI:** SM, Roger Volk, K0GOB—Because of my business travel schedule, Tom, K1OJO, has been collecting the net reports, the PSHR info and the SARs and forwarding them to me via e-mail so that I can write this column from any hotel in the country. To recognize his past contributions and to allow him to pick up additional assignments as they come along, he has been appointed an Assistant Section Manager. You can find Tom on the MOTRAN at 5:45 PM local on 3963 KC or he can be reached at his e-mail address at [k1ojo@laurie.net](mailto:k1ojo@laurie.net). He is also active on Packet and his mailbox is K1OJO@N0LBA.#CEMO.MO. When you see him at future hamfests, thank him for his efforts on behalf of the section. I just got back from the Warrensburg hamfest and want to thank all of the League members that stopped by the ARRL booth to say hello. Their Legion Post serves up an excellent breakfast and lunch for the event and I want to thank the club for their hospitality while I was in the area. I started to list the clubs that actively participated in the MS150 bike ride, but the list overwhelmed the space allocated. Many hams passed up the Columbia hamfest to provide communications for the event. Now that's dedication to the public service aspect of ham radio. Repeaters are expensive to build and maintain. And, each machine "belongs" to someone or group. During the MS150, many repeater owners allowed their machines to be used for extended periods of time. Thanks! By the time you read this, Jim, KF0BM, should be back in his home after a lightning induced fire did extensive damage. Old man Murphy must have been sleeping at the time because the lightning missed his tower and ham equipment. Have a Merry Christmas and a Happy New Year! Nets: MOTRAN 30/564/116 K0PM; STLRPTR 5/118/7 K0WEX; PAULREVERE 4/448/0 N0WHA; K0YML; HAMBUTCHERS 22/767/96 WL7YM; MON1&2 60/167/52 W0OTF; ROLLARB 30/447/11 NA0V; KCABARC 5/177/5 KA0SSE; WAARCI 4/95/0 W0EG; AUDRANARC 3/21/2 WB0SE; CARL 3/43/1 KC0MV; WJACKCOARES 4/23/0 K0UAA; GOBNET 30/225/24 WL7YM. TIC: K1OJO 131; KE0AH 105; W0OTF 87.

**NEBRASKA:** SM, Bill McCollum, KE0XQ—ASMs: W0KVM, N0MT, WB0ULH, WY0F & WB0YWO. The Midway ARC (Kearney) will be sponsoring a Hamfest on Jan. 10, 1998 at the Buffalo County Extension Building in Kearney. Contact W0PXD for further information. Congratulations to Pine Ridge ARC member K0OAL for winning QSO parties in Texas, VA and the CHC contest. Carl, KB0KDO advises me that the Tangier Masonic Amateur Radio Club has formed in Omaha. One must be a Shriner to belong. The club plans on being affiliated with the ARRL. This will bring the number of affiliated clubs to 20 in the state. Congratulations to Reynolds, K0GND, for being appointed DEC for Eastern Nebraska. KF0MS has resigned as NM for the Dodge County ARES Net. Replacing him is N0LGU. Thanks, Steve, for your work! On October 8, Midwest Division Director K4VX presented a cover plaque to Tom Spann, WD0HBR, for his article on the FCC Grand Island Monitoring Station which appeared in the November 1996 QST. After the presentation, WD0HBR showed a videotape of the monitoring station. 9 members of the Elkhorn Valley ARC participated in a disaster exercise in September. TIC: K0PTK 97, WC00 35, KE0XO 30, W0EXK 4, WY0F 2, W0W2R, AA0KQ2, KF0MS 2, KA0DOC 2, KF0FO 1. PSHR: KA0DBK 80, KB0YTM 51.

### NEW ENGLAND DIVISION

**CONNECTICUT:** SM, Betsey Doane, K1EIC—ASMs: KZ1Z, KB1H, NK1J, K1STM, N1API; ACC WA1CBW. BM: KD1YY. OOC: W1FAI. PIC: W1FXQ. SEC: N1U. SGL: K1AH. STM: K1HEJ. TIC: KA1KJZ. I am writing this just a few hours after having returned from the CT State Convention in Durham. It really was lots of fun—plenty to look at and lots of friends to see! It was nice to see the forums so well attended. The Meriden ARC and Middlesex ARS worked tirelessly for the benefit of all of us. And folks, the weather surely cooperated! It was a real pleasure for me to present the Charter of Affiliation to Al, N1JWF, who received it on behalf of The Plainville Amateur Radio Club. PARC, as they are known, has participated in a number of public service events. Many thanks to John Hennessee, N1KB, of ARRL, for giving his well-received talk on Amateur Radio regulations. A big thank you to all of the speakers, VEs and to those who gave special demonstrations. And my thanks to all of you for your continuing support and encouragement. The Simulated Emergency Test was certainly a busy weekend for many ops in CT. Happily, this year we had several newly licensed participants become involved in this annual exercise. Congratulations to Harry, N1JTL, EC of Hartford, and all those who worked with him on a successful exercise with Hartford Hospital. Working with other agencies in emergency preparedness demands a significant effort and a lot of planning. Harry's group was invited to participate in this drill! Great job! This season will continue to be a busy one—I will be speaking at The Insurance City Repeater Club and will join Director Frenaye at

# MFJ ACCESSORIES

## MFJ W9INN Balun Box



MFJ-912

\$39.95

Lets you use coax from your antenna tuner to the MFJ-912 mounted outside your ham shack. The MFJ-912 converts the imbalanced coax to a balanced transmission line (ladder line). Provides same function as an internal balun except it is located away from tuner. Giant 2 core balun wound with Teflon® wire connected to high voltage ceramic feedthru insulators. Handles full legal power with ease. 3 1/4x2 1/4x7 inches.

## MFJ Artificial RF Ground

MFJ-931

79.95



Creates

artificial RF

ground that eliminates or reduces RF hot spots, RF feedback, TVI/RFI, weak signals caused by poor RF grounding.

Greatly improves your signal if you're using a random wire or long wire antenna with an ineffective ground.

Electrically places a far away RF ground directly at your rig by tuning its reactance of connecting wire.

## 20 Meter CW Transceiver

MFJ-9020

189.95



Throw this MFJ 20 Meter CW Transceiver in a corner of your iefcase and enjoy DXing and chewing wherever you go. You get high performance superhet receiver, crystal filter, RIT, AGC, vernier tuning, detone, speaker, up to 5 watts output, full break-in, much more. Free annual. See free MFJ catalog for 40, 17, 15 Meter versions, keyer, audio ter, power pack, tuner, antennas.

**Super Active Antenna**  
World Radio TV Handbook says FJ-1024 is a "first rate easy-to-operate antenna...quiet...excellent dynamic range...good gain... low noise...broad frequency coverage... excellent choice."

Mount it outdoors away from elec- cal noise for maximum signal, mini- um noise. Covers 50 KHz - 30 MHz.

Receives strong, clear signals from all over the world. 20 dB attenuator, gain control, ON LED. Switch two receivers and aux. or active antenna. 6x3x5 in. Remote has 54 inch whip, 50 ft.

coax. 3x2x4 in. 12 VDC or 110 VAC with MFJ-1312, \$12.95.

29.95 MFJ-1024

## ross-Needle SWR Meter

MFJ-815B

69.95

Peak/ average Cross-needle SWR/ attmeter. Shows SWR, forward/ reflected power in 2000/500 & 200/50 att ranges. 1.8-60 MHz.

Mechanical zero. SO-239 connectors. Lamp uses 12 VDC or 110 AC with MFJ-1312, \$12.95.

## MFJ Coax Antenna Switches

\$39.95

MFJ-1701

Select any of several antennas from your operating desk with these MFJ coax switches. They feature mounting holes and automatic grounding of unused terminals. One year "No Matter What" unconditional warranty.

**MFJ-1701, \$39.95.** 6 position antenna switch. SO-239 connectors. 50-75 Ohm loads. 2 KW PEP, 1 KW CW. 10x3x1 1/2 inches. DC-60 MHz.

**MFJ-1702B, \$21.95.** 2 positions plus new Center Ground. 2.5 KW PEP, 1 KW CW. Insertion loss below .2 dB. 50 dB isolation at 450 MHz. 50 Ohm. 3x2x2 inches. **MFJ-1702BN, \$31.95.** N-Connectors, DC-1.1 GHz.

**MFJ-1704, \$59.95.** 4 position cavity switch with lightning surge protection. Center ground. 2.5 KW PEP, 1 KW CW. 50 dB isolation at 500 MHz. 50 Ohm. 6 1/4x4 1/4x1 1/4 inches. **MFJ-1704N, \$69.95.** N-connectors. All have MFJ's famous "No Matter What" 1 year unconditional warranty.

## MFJ Compact Speaker Mics

MFJ's compact speaker mics have first-rate electret mic element and full size speaker gives superb audio on transmit and receive. Earphone jack, PTT, light-weight retractable cord. Gray. 1 1/4x2x3 in. **MFJ-284** fits Icom, Yaesu, Radio Shack and Standard. **MFJ-286** fits Kenwood.

## MFJ Mini Speaker Mics

MFJ's mini mics give excellent audio from electret mic element and speaker. Has swiveling lapel/pocket clip, PTT button with transmit LED, earphone jack, lightweight retractable cord. Available with "L" or regular connector. Tiny 2x1 1/4x1 1/4 inches.

**Order MFJ-285/285L** for Icom, Yaesu, Alinco, Radio Shack and Standard; **MFJ-287/287L** for Kenwood; **MFJ-283** for split plug Alinco; and **MFJ-285W** for IC-W2A.

## Dry Dummy Loads for HF/VHF/UHF

MFJ has a full line of dummy loads to suit your needs. Use for tuning to reduce needless (and illegal) QRM and save your finals.

**MFJ-260C, \$29.95.** VHF/HF. Air cooled, non-inductive 50 ohm resistor. SO-239 connector. 300 Watts for 30 seconds, derating curve. SWR less than 1.3:1 to 30 MHz, 1.5:1 to 650 MHz. 2 1/2x2 1/2x7 in. **MFJ-260CN, \$34.95.** N connectors.

**MFJ-264, \$59.95.** Versatile UHF/VHF/HF 1.5 KW load. Low SWR to 650 MHz, usable to 750 MHz. 100 watts/10 minutes, 1500 watts/10 seconds. SWR is 1.1:1 to 30 MHz, below 1.3:1 to 650 MHz. 3x3x7 in. **MFJ-264N, \$69.95.** N connector. **MFJ-5803, \$4.95.** 3 ft. coax/PL-259.

## MFJ Low Pass Filter

Suppress MFJ-704 TVI, RFI, telephone and other interference by reducing unwanted harmonics going to your antenna. 9 poles, MFJ's exclusive Teflon® Dielectric Technology™ capacitors, hi-Q inductors, ground plane shielding, RF tight cabinet gives excellent TVI/RFI protection. Full legal power 1.8-30 MHz. Mounting tabs. **MFJ-702, \$24.95.** 200 Watts Low Pass TVI filter. 1.5-30 MHz.

**MFJ-704, \$39.95.** 120VAC

Use your MFJ-1214PC computer and transceiver to receive, display and transmit

brilliant full color news photos and incredible WeFAX weather maps with all 16 gray levels. Also receive/transmit RTTY, ASCII and CW.

**Animate** weather maps. Display 10 global pictures simultaneously. Zoom any part of picture or map. Manager lists over 900 FAX stations. Automatic picture capture and save.

"Teflon® is a registered trademark of Dupont"

MFJ-1214PC, \$149.95

\$21.95

MFJ-1702B

\$59.95

MFJ-1704

## High Pass TVI Filter

MFJ-711

\$19.95

Don't let harsh TVI ruin your DXing and your wife's favorite soap opera! Keep peace with your family and neighbors.

MFJ's exclusive **ShieldBreaker™** high pass filter effectively suppresses annoying TVI! Wipe out TVI caused by broadcast, commercial, two-way, amateur and CB radios operating below 30 MHz. Use between cable/ antenna and TV/VCR. For 75 ohm cable or 300 ohm twin lead.

## 12/24 Hour LCD Clocks

5:35 1735

5:35

19.95 MFJ-108B

24.95 MFJ-112

MFJ-108B dual clock has separate UTC and local time displays. Huge 5/8 inch LCD digits are easy-to-see. Brushed aluminum frame.

MFJ-112 shows hour/minute/ second, day, month, date, year at any QTH on world map. 12 or 24 hour display. Daylight saving time feature.

## VHF SWR/ Wattmeter

MFJ-812B

29.95

Covers

2 Meters and 220 MHz. 30 and 300 Watt scales. Relative field strength 1-250 MHz, SWR above 14 MHz. 4 1/2x2 1/4x3 in.

## Code Practice Oscillator

MFJ-557

MFJ-557 Deluxe Code Practice Oscillator has a Morse key and oscillator unit mounted together on a heavy steel base so it stays put on your table. Portable. 9-volt battery or 110 VAC with MFJ-1305, \$12.95.

Earphone jack, tone and volume controls, speaker. Adjustable key. Sturdy. 8 1/2x2 1/4x3 3/4 in.

## MFJ Multiple DC Outlet

MFJ-1118

69.95

Use your rig's 12 VDC power supply to power two HF/VHF rigs and six or more accessories with this MFJ high current multiple DC outlet.

2 pairs of 30 amp 5-way binding posts separately fused for rigs. 6 switched, fused pairs for accessories. DC voltmeter, "on" LED, RF bypassed, 6 ft. of 8 gauge power cable. 12 1/2x2 3/4x2 1/2 in.

MFJ-1116, \$44.95. 8 DC outlets, voltmeter, on/off switch, RF bypass, fuse. MFJ-1112, \$29.95. 6 DC outlets.

## Free MFJ Catalog

Nearest Dealer... 800-647-1800

• 1 year unconditional guarantee • 30 day money back guarantee (less s/h) on orders from MFJ • Add s/h

MFJ

MFJ ENTERPRISES, INC.

P.O. Box 494

Mississippi State, MS 39762

Prices/Specs subject to change © 1997 MFJ Inc.

• MAIN 601-323-5869 • FAX 601-323-6551 • TECH 601-323-0549

• CALL 8-4:30 CST, Mon-Fri • E-Mail [mfj@mfjenterprises.com](mailto:mfj@mfjenterprises.com)

Web Site: <http://www.mfjenterprises.com>

MFJ... the world leader in ham radio accessories!

# BRAND NEW FOR 1998!

**Mastering Code, Upgrading or Perfecting Skills  
Was Never Easier or More Fun!**

## Think it's too hard to learn? Just listen to these reports!

"I was a Tech for 21 years. Code Quick gave me 20 WPM in 3 mo! My friends were amazed!"  
SW WA4QCB

**"Absolutely fantastic, best teaching method around. No code to Extra in 12 weeks!" MJ AD6CC**

"I tried to learn code for 5 years Code Quick did it for me in two weeks!" AB N9XHE

"Tried another course for 2 months knew only half of the alphabet. Our ham club president asked me to try CQ. Today I passed my 20! It's marvelous!" MB DG9JN

Want more?

Jump on any repeater and mention Code Quick. You'll get an earful!

## WHAT ARE YOU WAITING FOR?

Code Quick is all new for 1998. Based on proven techniques, the imaginative **30 DAY MORSE SUCCESS PLAN** comes with everything you need to set the code forever in concrete. Next, surge ahead to 13 and even 20 WPM with VE exam type daily drills. Your kit is jammed with over 40 brand new power exercises to cinch your success. It works so well we can say,

**"If you don't pass, we'll buy it back. You'll just pay postage!"**

Order your copy today, and be sure to tell us your next goal so we can tailor the program just for you! Have your kit in 3 days!



**WHEELER APPLIED RESEARCH  
38221 DESERT GREENS DR. W.  
PALM DESERT CA 92260**

**800 782-4869**

Also don't miss out on our new computer  
program for Windows 95

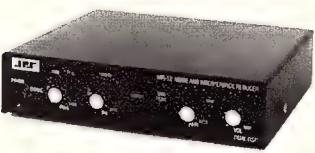
<http://www.codequick.com>

## Power line noise, ignition noise, atmospheric noise, etc.?



**ANC-4 ANTENNA NOISE CANCELLER**  
Eliminates POWER LINE noise before it enters the receiver. Lets you hear signals you didn't know were there. Reduces any locally-generated noise typically by 50dB. Usable between 100 kHz and 80 MHz. Noise whip and wire antenna supplied with each unit. Requires 12 VDC @ 300 mA. Installed between antenna and receiver.

Between the antenna and the receiver  
List Price: \$195



**NIR-12 DUAL DSP NOISE REDUCER  
AND FILTER UNIT**  
The most advanced DSP noise reduction unit available. Unparalleled performance; super-selective FIR filters, fully adjustable center frequency and bandwidth; both Dynamic Peaking and Aural Spectral Subtraction Noise Reduction; spectral multi-tone NOTCH filter. All NIR-12 modes usable simultaneously. Use on all operating modes, including AMTOR & PACTOR. Installed between receiver audio out and external speaker. Requires 12 VDC @ 1A peak.

Between the receiver and the speaker  
List Price: \$375

**When You Want The Best, Get JPS. First And Finest In Noise Reduction.**

**JPS Communications, Inc.**

**TOLL FREE ORDER LINE: 800-533-3819**

We accept MC, VISA, Money Order, or Check (SUS)  
PO. Box 97757, Raleigh, N.C. 27624 FAX: (919) 790-1011 Tech. Line: (919) 790-1048  
<http://www.jps.com> Internet: [jps@jps.com](mailto:jps@jps.com)

**Contact us for a  
dealer near you.**

Lifetime warranty to original owners.  
115 VAC to 12 VDC adapter available.

the Candlewood ARA in the next couple of months. Phil, KA1YIQ, and John, N1OLO, of FARA have been working with the Discovery Museum in Bridgeport and have installed an Amateur Radio station there. More to follow on this continuing exhibit as details become available. Clubs are of course planning their holiday parties at which I hope to see some of you as my time permits. Speaking of holidays, best wishes to all of you from all of us on the section cabinet for a very happy and safe Thanksgiving. Net sess/QNI/QTC: NTVN 29/179/106; WESCON 30/400/156; RTN 29/188/56; CPN 30/221. Tfc: NM1K 2501, KA1VEG 699, K1EIC 543, WA4QXT 319, K1HEJ 310, KA1GWG 248, N1VXP 164, N1NYJ 52, N1YVV 35, KE1AI 18, W1GPS 5.

**EASTERN MASSACHUSETTS:** SM, Larry Ober, W1MW—ASMs: WA1IDA, AA1FS, KE1BG, N1GTB, N1UGA, N1NSGL. ACC: Open. BM: N1IST. OOC: K1LJN. PIC: N1PBA. SEC: W3EVE: K3HI. STM: WA1TBY. TC: W3EVE. EMA ARRL: voice: 508 263-2498. Packet bulletins: ARRL@EMABBS. E-mail: w1mw@arrl.org. e-mail list: ema-arrl@netcom.com. Web: <http://www.qsl.net/ema-arrl>. Two of my Field Day photographs graced the cover of November's QST. The shot of Bob Melvin, WT1O, instructing a potential Novice was incorrectly captioned in QST. It was taken at the combined Barnstable ARC and Sandwich ARC site at the Cape Cod Canal. Lew Collins, W1GXT, has put together a talk on compliance with the new FCC mandated RF safety guidelines. Don't miss this important presentation. Invite Lew to your club ASAP. The new guidelines are effective 1-1-98! The Algonquin ARC is holding a CW practice net on the 446.675 repeater Sundays at 7:00 PM and is considering starting a RTTY net on the Novice/Tech+ portion of 10 M. Nashoba Valley ARC provided Emergency Communications Support for the New England Regional Soccer Tournament on Columbus Day weekend. They also helped clean up a section of Rte 119 under the "Adopt A Road" program. It's good PR as sponsors get credit on highway signs. Brooms and shovels anyone? Sturdy Memorial Hospital ARC has held a pre-holiday dinner November 8. Whitman ARC operated a special-event station, WA1NPO, at the Marshfield Fair which helped generate interest in their September licensing classes. Quanapowitt RA continues to sponsor VE sessions in conjunction with Melrose ARES the 3rd Saturday at the First Baptist Church in Melrose. Framingham ARA has rescheduled their License in a Weekend class to November. Southeastern Mass ARA reports that the Fairhaven Repeater Weather Net held its fall meeting in October. A meteorologist from the National Weather Service in Taunton on was the featured speaker Don Haney, KA1T, will speak on the Pilot Program for Special Service Clubs at the November 20 Wellesley ARS meeting. Boston ARC assisted WGBH public television and radio at their annual Ice Cream FunFest fundraiser. Congratulations to those sporting new calls under Gate 3 of the Vanity Call Sign Program. The Second Commandment of Electrical Safety: "Cause thou the switch that supplieth large quantities of juice to be opened and thusly tagged, that thy days may be long in this earthly vale of tears." 73 de W1MW. Tfc: N1OTC 1067, WA1TBY 225, WB2EAG 169, N1LKJ 129, WA1FNM 81, KB1AF 60, WA1LPM 55, KA1WCD 42, N1ZFF 38, N1SGL 38, N1IST 32, K8SH 29, N1TDF 28, N1LAH 27, N1XYS 27, N1AJJ 18, KA1VAX 12, K1SEC 12, KB1EB 9, KA1BBU 8, N1XQC 7, KA1YLC 5, N1TPU 2.

**NEW HAMPSHIRE:** SM, Al Shuman, N1FIK (BBS@WA1WOK)—ASMs: WB1ASL, W1NH, N3CLZ, W1JS, N1FIL, N1KIM. ACC: NA1E. STM: WA1JVV. BM: KHEGR. OOC: W1GTA. TC: WA1HOG. SEC: WB1ASL. SGL: K1KM. PIC: KA1GOZ. Pleased to announce Dennis Hennigan, WA1HOG, has been appointed as the Technical Coordinator for the NH Field Organization. Dennis, a test engineer, has over 16 years in the EMI/EMC/RFI products field. Dennis assumes the reins from Johnny Johnson, W1JY, who retired earlier this year. It is with great sadness that I inform you of the passing of James Thayer, W1FZ, of Farmington. It is not often that I dedicate a major portion of my column to one topic. However, in this case, it is appropriate. Jim died tragically on Oct 7. Jim, a lifetime member of the ARRL, was also an Elmer for the GBRA. Jim, 90 yrs, was a ham for over 75 yrs. His commitment to Amateur Radio and his community was unwavering. Jim, an avid DXer who held DXCC with contacts for all countries, purchased HF radios for each student who received a license in the Farmington School system. The GBRA has used his property for Field Day for many years. Jim was the President of the Farmington National Bank, President of the Union Telephone Co, Selectmen and member of the Farmington school committee. Donations in Jim's memory should be made to the Farmington Public Library. Jim will be greatly missed. -73. Al. Net/Sess/QNI/QTC/QTR: GSFM 30/427/107/840; GSPN 34/178/39/335; TSEN 4/55/2; VTNH 30/185/118/486. Tfc: W1FYR 1580, W1PEX 641, K1TQY 235, WA1JVV 153, WB1GX 122, N1KPT 91, N1CPX 85, W1ALE 74, AA1QD 62, N1NH 52, K1ZQ 30, KA1OTN 28, AE1T 22.

**RHODE ISLAND:** SM, Rick Fairweather, K1KYI—e-mail k1kyi@juno.com—ASMs: N1JYQ. ACC: AA1CE. STM: WA1CSO. SEC: N1JMA. OOC: W1ACM. TC: KA1EGY. BM: KA1BNO. SGL: N1N1K. Hope you all enjoyed the holiday season this year. This time of year always builds lots of message traffic for the nets. K1TPK, a dedicated traffic handler sidelined by illness, is missed a great deal on the traffic nets in RI. Why not get on and lend a hand on 147.36 Monday thru Saturday evenings at 8:30 PM local time during this busy time of year and help fill the void left by Manly's absence. Our dedicated group of traffic handlers gave RI 100% representation on the FRN again during September. Congrats! Make sure to keep me informed of your club's activities by keeping me on the mailing lists. Speaking of newsletters, the Amateur Radio News Service is sponsoring their annual newsletter contest. Call me for details if you want to enter your club's newsletter. As of mid-October, only the Northern RI Radio Club has signed on to the ARRL's "Get on the air program." If you need details, give me a call. Congrats to W1ACM, our OOC, on his new call sign His old call was WA1ZFS. Tfc: WA1CSO 72, KA1JXH 45, K1KYI 7. PSHR: WA1CSO 126, KA1JXH 118.

**VERMONT:** SM, Bernie Capron, N1NDN—A search and rescue operation took place in Reading, VT, with all turning out well when the person was found at a friend's house. Nonetheless, several hams in the area participated in this

# MFJ-1270C VHF/HF Packet TNC

The world's most reliable TNC! Many work 24 hours-a-day for years without a single failure

MFJ-1270C Packet TNC has a world-wide reputation as the most reliable TNC in the world!

Thousands are dedicated as digipeaters, nodes, BBS and used in all kinds of commercial applications working 24 hours a day -- many work for years without a single failure.

#### Fully TAPR TNC-2 Compatible

All software and hardware designed for the TAPR TNC-2 standard works with the MFJ-1270C without modification, including NETROM, theNET, X1J, Rose Switch and many others.

#### VHF and HF Operation

Get high performance VHF and HF modems as standard equipment -- doubles your fun. True DCD circuit drastically reduces sensitivity to noise and dramatically increases completed QSOs.



MFJ-1270C **\$119.95**

#### KISS Interface and MFJ Host Mode

MFJ's KISS interface lets you run TCP/IP. MYSYS and MFJ's Host Mode™ makes it easy to write efficient application programs.

#### MFJ Anti-Collision™ Technology

MFJ Anti-Collision™ technology prevents packet collisions and improves performance on busy channels.

## TNC ACCESSORIES

#### MFJ MultiCom™ for Windows

Incredibly easy-to-use. Just point and click to enjoy all the power of your MFJ-1278/B/DSP. Run two TNCs at the same time in separate windows. MFJ-1289W, \$59.95, includes 3 1/2 inches HD disk, RS-232 serial cable and manual.

#### MFJ MultiCom™ for DOS

Powerful DOS software for MFJ-1278/B/DSP, MFJ-1289M, \$59.95. Includes 3 1/2 inch HD disk, RS-232 serial cable and manual.

#### MFJ Starter Packs

An MFJ Starter Pack, \$24.95, gets you on the air instantly. You get interface cable, software on disk and instructions -- just plug it all in and start enjoying packet. Order MFJ-1284 for DOS, MFJ-1287 for Macintosh or MFJ-1282 for Commodore 64/128.

#### 2400 Baud Modem -- **\$29.95!**

MFJ-2400, \$29.95. Add fast 2400 baud Packet to most versions of MFJ-1270, MFJ-1276 and MFJ-1278. Plugs into MFJ TNCs for easy installation.

#### 9600 Baud Modem

MFJ-9600B, \$109.95, G3RUH compatible 9600 baud modem. Plugs into MFJ TNCs. Not all radios compatible with 9600 baud.

#### Real Time Clock

MFJ-43, \$19.95. Ends resetting TNC clock everytime you turn it on. Maintains correct time even when TNC is off. Plugs into RAM socket. Works with MFJ TNCs and TAPR TNC clones.

you're ready to go -- no more hard-to-find connectors and wiring up cables.

Works with HF, VHF and UHF radios with 8 pin mic connectors -- including Kenwood, ICOM, Yaesu, Alinco, Radio Shack, Standard and others. For radios with 8-pin RJ-45 modular telephone jack, select the new "M" models.

Plug-in jumpers let you quickly set-up for virtually any radio. Factory set for Kenwood and Alinco. Includes easy-to-follow instructions. Has audio-in and speaker jacks. 3 1/4x1 1/4x4 inches.

MFJ-1272B/1272M, \$39.95, for MFJ TNC/multimodes, TAPR TNC-2 clones.

MFJ-1272BX/1272MX, \$39.95, for PK-232.

MFJ-1272BYV/1272MYV, \$39.95, for KAM VHF/KPC3.

MFJ-1272BYH/1272MYH, \$39.95, for KAM HF Port.

## PACKET plus PACTOR TNC

You get all the features of the MFJ-1270C HF/VHF TNC plus... PACTOR... precision HF tuning indicator... extra 32K mailbox memory...

**PACTOR** MFJ-1276 **\$139.95**  
combines the best of Packet and AMTOR for HF. You get excellent weak signal operation, error correction, faster baud rate, data compression and full 8-bit word transmissions.

A 20 LED bargraph makes HF tuning easy. Just tune your radio to center a single LED and you're precisely tuned in to within 10 Hz -- and it shows you which way to tune!

You also get an extra 32K of memory for your enhanced Easy Mail™ packet mailbox.

**MFJ-1276T**, \$169.95, same as MFJ-1276 but includes fast 2400 baud modem. Lets you operate 300, 1200, and 2400 baud packet.

#### Enhanced Personal Mailbox

Enhanced EasyMail™ uses your call-sign for your mailbox. Your mailbox stays on while you operate. Auto forward or reverse forward mail.

#### Plus much, much more!

32K RAM, IC sockets for easy service. 256K ROM, speaker jack, lithium battery backup, RS-232 and TTL serial ports, radio cable (you add a connector for your radio), *Fast-Start*™ manual, much more!

#### 2400 & 9600 Baud MFJ-1270Cs

MFJ-1270CT, \$149.95. All the features of MFJ-1270C plus built-in 2400 baud modem.

MFJ-1270CQ, \$229.95. All the features of MFJ-1270C plus built-in 9600 Baud G3RUH modem.

MFJ-52, \$29.95. TNC2 Deviation Meter Board. TheNet X-1J Node and users can check transceiver packet FM deviation, temperature and voltage.

## The world's most powerful multi-mode data controller! DSP... 10 Digital Modes... GPS Compatible

MFJ-1278B/DSP **\$379.95**

The world class MFJ-1278B with built-in "brick wall" DSP filters gives you ham radio's most powerful multi-mode data controller!

You won't believe your eyes when you see solid copy from signals completely buried in QRM! The MFJ-1278B/DSP, your transceiver and computer are all you need for exciting digital QSOs! You'll discover a whole new world of ham radio. You'll communicate in ways you never knew existed!

You'll marvel at full color FAX news photos as they come to life on your screen, and you'll see weather changes on highly detailed weather maps in all 16 gray levels. Eavesdrop on late-breaking news!

MFJ-1278B/DSP gives you DSP and 10 digital modes -- Packet, PACTOR, AMTOR, RTTY, Color SSTV, 16 Gray Level Fax/Weather FAX, ASCII, Navtex, CW, Memory Keyer and is GPS compatible!

Enjoy all the power of your MFJ-1278B/DSP with MFJ's *MultiCom*™ software. MFJ-1289W, \$59.95, for Windows. MFJ-1289, \$59.95, for DOS. Call for free *FastStart*™ Manual for more details.

MFJ-1278B/DSP, \$379.95, has powerful DSP. MFJ-1278B, \$299.95, less DSP. MFJ-1278BT, \$329.95, built-in 2400 baud modem, less DSP. MFJ-44, \$19.95. Plug-in scope tuning adapter.

## MFJ PacketOnly™ transceivers



MFJ-8621  
**\$119.95**  
Runs all data  
rates from 1200  
to 9600 Baud

Why tie up your expensive 2 Meter rig on a single packet channel? For an incredibly low \$119.95, you can enjoy dedicated high performance packet from 1200 to 9600 baud on 2 Meters, 24 hours a day!

MFJ's *PacketOnly*™ data radios are compatible with all TNCs with hardware DCDs and most TNCs with software DCDs.

Getting started couldn't be easier -- just plug in an appropriate TNC cable (also available), your antenna, 12 VDC and you're ready to enjoy error-free Packet!

MFJ-8621, \$119.95. Ready-to-operate on 145.01 MHz. For other frequencies, order plug-in crystals for just \$24.95 per frequency.

MFJ-8621X1, \$139.95. Ready-to-use APRS (Automatic Packet Reporting System) transceiver. Crystals pre-installed and transceiver precisely aligned. Ready-to-operate on 145.79 MHz.

MFJ-8631, \$139.95. *PacketOnly*™ 220 MHz Data Radio. Has all the features of the 2 Meter version, ready-to-operate on 223.700 MHz.

MFJ-9606, \$149.95. Use Voice or Packet with MFJ's new 6 Meter *FM Communicator*™ Transceiver. Perfect for No Code Techs and Veterans alike. Crystaled for 52.525 MHz calling frequency. Easy to re-channel. MFJ-9606X, \$159.95. Includes Mic.

## MFJ TNC/Mic Switch

Switch between your TNC or Mic by pushing a button!

Switch between your MFJ-1272B/M microphone and TNC by pushing a button! **\$39.95**



You won't have to unplug your microphone and plug in your TNC everytime you want to work packet or other digital modes.

Just plug these pre-wired cables into your rig's microphone connector and into your TNC and

## Pre-wired Radio-to-TNC cables... **\$14.95**

TNC Type Radios	All MFJ TNCs and Multimodes	KAM VHF/ KAM HF/ KPC3/ KPC9612	PK-232	PK900/PK96/ PK12/DSP232/ PacComm/ other TNC-2 compatibles
Alinco/Stdrd HT	MFJ-5022	MFJ-5022YY	MFJ-5022X	MFJ-5022
Icom/Yaesu/ Radio Shack HTs	MFJ-5024	MFJ-5024YY	MFJ-5024X	MFJ-5024B
Kenwood HTs	MFJ-5026	MFJ-5026YY	MFJ-5026X	MFJ-5026
Yaesu 8-pin	MFJ-5080	MFJ-5080YY MFJ-5080YH	MFJ-5080X	MFJ-5080Z
Icom 8-pin	MFJ-5084	MFJ-5084YY MFJ-5084YH	MFJ-5084X	MFJ-5084Z
Kenwood/Alinco 8-pin	MFJ-5086	MFJ-5086YY MFJ-5086YH	MFJ-5086X	MFJ-5086Z
Yaesu 8-pin modular	MFJ-5080M	MFJ-5080MYV	MFJ-5080MX	MFJ-5080MZ
Icom 8-pin modular	MFJ-5084M	MFJ-5084MYV	MFJ-5084MX	MFJ-5084MZ
Kenwood 8-pin modular	MFJ-5086	MFJ-5086MYV	MFJ-5086MX	MFJ-5086MZ
Radio Shack 8-pin modular	MFJ-5088M	MFJ-5088MYV	MFJ-5088MX	MFJ-5088MZ

1. does not include IC-W2A

2. does not include 2500

3. does not include 25A, 255A

4. does not include IC-100H, IC-270H

5. YV for KAM VHF port, YH for HF port.

6. YV for KPC9612 1200 baud port

7. YH moduls for KPC9612 9600 baud port

8. Excludes DJ-100, 120T, 200, 500

## FREE MFJ Catalog

Nearest Dealer/Orders... 800-647-1800

<http://www.mfjenterprises.com>

E-mail: [mfj@mfjenterprises.com](mailto:mfj@mfjenterprises.com)

Technical information: 601-323-0549

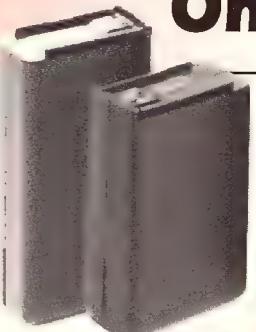
• 1 year unconditional guarantee • 30 day money back guarantee (less s/h) on orders from MFJ • FREE catalog

**MFJ** MFJ ENTERPRISES, INC. Box 494, Miss. State, MS 39762 (601) 323-5869; 8:40-30 CST, Mon.-Fri. FAX: (601) 323-6551; Add s/h

**MFJ**... the world leader in ham radio accessories

Prices and specifications subject to change © 1997 MFJ Enterprises, Inc.

# "Charge Nearly Any NiCd and NiMH with One Charger!"



**\$40<sup>00</sup>  
SPECIAL**

## NiCd

EBP-24S	7.2	1200ma NiCd
FNB-4SL	12	800ma NiCd
PB25S/26S	8.4	1200ma NiCd
PB-7S	7.2	1200ma NiCd

Above NiCD battery packs are warranted for 12 months from date of purchase.

## NiMH

BP-84M	7.2	1300ma NiMH
FNB-25M	7.2	900ma NiMH
FNB-41M	9.6	900ma NiMH
PB-13SM	7.2	1300ma NiMH

Above NiMH battery packs are warranted for 6 months from date of purchase.

## PERIPHEX REPLACEMENT BATTERIES

Policies and prices subject to change without notice.

Offer expires December 31, 1997

- For: Communications, Laptop, Camcorders & Many Other Applications
- Charges 4.8V, 6.0V, 7.2V, 8.4V, 9.6V, 10.8V, 12.0 Volt Packs
- Chemistries:
  - Nickel Cadmium (Ni-Cd)
  - Nickel Metal Hydride (NiMh)
- Discharges (Conditions)
- Rapid Charges (with Polarity Protection)
- Can be used in your Vehicle (Except for 10.8V & 12.0V Packs)



Advanced Battery Systems, Inc. 300 Centre Street, Holbrook, MA 02343

(800) 634-8132 • (617) 767-5516 • Fax: (617) 767-4599

<http://home.navisoft.com/periphex>

## AT-11 Automatic Antenna Tuner

**\$219.00**

\$10 US shipping, MD add 5% Tax



Assembled and Tested version of the popular Kit Featured in January 96 QST.

High Efficiency, Microprocessor Controlled, Switched "L" Network. For Dipoles, Verticals, Inverted Vees, Beams or any Coax Fed Antenna. LED SWR Indicator. 12 Volt Operation, 500 mA.

Kit **\$150.00**

Plus \$8 shipping.

Kit with **\$180.00**

enclosure Plus \$10 shipping.



ELECTRONICS

**LDG Electronics**

1445 Parran Road  
St. Leonard MD 20685

[ldg@radix.net](mailto:ldg@radix.net)

Orders: 410-586-2177

FAX: 410-586-8475

<http://www.radix.net/~ldg>



situation. The Twin State Radio Club held another fox hunt with Bill and Dot Burden being the foxes. They hid in New Hampshire, but they were found anyway. Vermont's first 900 MHz repeater is on the air in Rutland. Thanks to Frank, W1AD, Brian, WA1ZMS, and others. Try it on 921.2 MHz. For those of you who are only on two meters, it is linked to the 147.045 repeater. Congratulations to Ryan Lilien, of Hartford, VT. He went from no license to General in one sitting. Wish N1ZSO congratulations when you hear him. Sessions/Checkins/Traffic: Vermont/New Hampshire Net (VTNH) 30/185/118; Vermont Phone Emergency Net (VPEN) 4/37/2; Green Mountain Net 26/88/40; Tri-State FM Emergency Net (Keene) 4/55/2; Public Service Honor Roll Stations: KT1Q 148, N1DHT121, Traffic: KT1Q '565, N1DHT 266, N2YHK 7; KA1YLN 6.\* BPL: Vermont had the following representation on 1RN: Cycle 2 - 88%.

**WESTERN MASSACHUSETTS:** SM: William C. Voedisch, W1UD, [w1ud.juno.com](http://w1ud.juno.com). ASM: N1LZC. ADM (Digital): KD1SM. STM: W1SJV. SEC: K1VSG. OOC: WT1W. It was great to see so many WMA people at the "Horsetraders" meet. Everyone was having a good time looking at equipment displayed for sale. The traffic nets are going well, but I would like to see more different stations checking in. Try WMM on 3562 at 7 PM local Mon, Wed or Fr. Check in at your comfortable operating speed. The net will adjust to your speed. The results of Field Day are out. It's encouraging to see so many clubs participating. Didn't look at the scores as FD is not a contest. The ability to set up for emergency operation is all that counts. I also discovered that we have four clubs that I cannot account for. They are in WMA, but I can't find any other info. I'd appreciate info either by packet, e-mail or a phone call. VE's, your job is not done when you examine and pass an applicant. Make sure he or she gets on the air and joins a club! Clubs should have Elmers ready to help these "youngsters." Statistics prove that 50% of these people will drop out of ham radio if they are not on the air within a year. These figures are unacceptable! Congrats to the operators at the Big E message fair. 5K pieces of traffic was handled by that crew! Tfc: KD1SM 24, W1ZPB 46, W1SJV 30, KD1XP 30, N1KXL 21, N1VHB 2443, W1KK 2593, N1ISB 22, W1UD 291.

## NORTHWESTERN DIVISION

**EASTERN WASHINGTON:** SM: Kyle Pugh, KA7CSP—SEC: WASZAY. STM: W7GB. OOC: KB7HDX. SGL: WB7UEU. TC: N7TOF. ACC: KA2LCZ. From the sound of things it appears that sunspot Cycle 23 has begun. According to George Fitzpatrick, W7LKR, of Pomeroy the Solar Flux hit 100 on Sept. 7, first time since Feb 24, 1994. There have been some openings recently on 10 and 12 meters, some sodd news for propagation. In September, 11 people volunteered 174 hours helping at the Klickitat County Fair representing the Klickitat and Wasco counties ARES and the Mid-Columbia ARC. And in cooperation with the Spokane American Morse Telegraphy Club, Gordon Grove, WA7LNC, and Don Felgenhauer, K7BFL, generated over 100 messages from the Spokane Interstate Fair. On Oct. 4, 33 Spokane area hams participated in Simulated Emergency Test (SET), which included several stations in WWA and N Idaho. Sorry to report Charles Dyer, K7RZE, as a Silent Key. Season's Greetings to everyone. Tfc: W7GB 321, K7GXZ 289, KA7EKL 105, K7BFL 104, W7UVP 38, KK7T 18. PSHR: W7GB 139, K7GXZ 134, W7UVP 73.

**IDAHO:** SM: Mike Langrelli, AA7VR—OOC: N7HGV. SEC: K17EP. STM: W7GHT. There were lots of activities this month. We just finished the 1997 Section Emergency Test, and it was a lot of fun working all of you. It's kind of nice to make contacts with hams in all of the counties in Idaho. I wish we had more time. 73, Mike, AA7VR. Tfc: W7GHT 207, KB7GZU 71, WB7VYH 70, and N7MPS 9. PSHR: W7GHT 122, WB7VYH 106, N7MPS 50. Net Sess/QNI/QTC/Mgr: FARM 30/2251/43/N7EZQ; NWTN 30/1932/46/KC7RNT; IDACD 23/516/12/K7UBC; IMN 30/286/117/W7VYH.

**MONTANA:** SM: Darrell Thomas, N7KOR—The Capital City Amateur Radio Club of Helena has announced a special-event station on November 8th. This will be to highlight the club's 50 years of affiliation with the ARRL. It is also the anniversary of Montana statehood. They will be operating from the state capital and hope to have the governor and other state officials attend the site. We hope many had the opportunity to work this station. The Yellowstone Amateur Radio Club of Billings has won the trophy for the most non-ham visitors at a Field Day site for the second year in a row. Congratulations to them. I had the pleasure of meeting Al Brogdon, W1AB, retired features editor from QST in Helena on September 13. He and his XYL were on an extended trip following his retirement and had stopped in the Helena area and were attending the weekly Saturday breakfast meeting. Sure hope he and his wife enjoyed their visit to Montana. I wish to extend Best Holiday Wishes from myself and my wife to all and hope you have a very Merry and safe Holiday Season. Net/QNI/QTC/MGR: N7WQH/970 W7OW; MTN/1688/72 N7AIK; IMN/286/117 WB7VYH.

**OREGON:** SM: Randy Stimson, KZ7T—ASM: W7FBP. ASM: KF7KE. ASM: KG7OK. ASM: N7QQU. STM: W7VSE. SEC: WB7NML. PIO: K7CYN. SGL: KA7KSK. ACC: AA7OA. STC: N7HMV. OOC: NB7J. Sorry for missing last month, but Cycle Oregon is the reason. Speaking of Cycle Oregon, it was one of the toughest communications weeks that I have ever had. Things that should have worked didn't, and I really don't know why. It has to do with the terrain. We were on the highest points as usual, but they wouldn't work. We had to have two of us on two high points for four of the seven days. There was one primary net with a back up net. We used cross band so that one net could deal with the hams on the SAG wagons. What we did was have two simplex frequencies where the hams would use one from start to lunch and switch to the other after lunch. The reason for simplex is we need to talk to the Oregon State Police, ambulances and 25 commercial mobiles for staff. So we did the entire event simplex. This way the primary net would listen on 440 and two meters and could talk to all of the hams on the SAG wagons. A SAG wagon is a 10 passenger van with a bike rack on it. They will pick up tired, injured riders and riders with bike problems and transport them. Cycle Oregon is a tour event with 2000+ riders riding around Oregon, and it is a week-long event. It covers up to 500 miles. There were 15 hams involved, 7 of which were on

**ICOM**

\$1079.95

IC-706 Compact HF w/6M & 2M  
Includes \$100 RebateIC-706MKII HF+6M+2M Transceiver  
FREE OPC-581 Sep. Cable Call \$\$IC-756 HF + 6M Transceiver FREE  
OPC-581 Separation Cable Call \$\$

IC-Δ100H 2M/440MHz/1.2GHz Mobile

IC-2710H 2M/440MHz Mobile FREE  
OPC-600 Separation Cable Call \$\$IC-2000H 2M Mobile 50 Watts, Wide  
Band Receive, 220 Memories \$259.95\$149.95  
(Export Only)IC-2GXH 2M HT w/ALK,  
Battery Pack and  
BC-105 ChargerIC-T22A 2M, HT 3 Watts, Easy-To-Use,  
Air Band RX Call \$\$

IC-T7A/HP 2M/440MHz HT Call \$\$

IC-T2A 2M/HT w/8AA Batteries Call \$\$

**ALINCO**  
ALINCO ELECTRONICS INC.

DX-77T New HF Base

DX-70T Compact HF

DX-70TH Compact,  
100W, HFDR-140T 2 Meter  
Mobile

DR-150T 2 MMobile

DR-605T 2M/440MHz

Mobile

DR-610T 2M/440MHz

Mobile

DJ-191TH 2M HT

DJ-G5TH 2M/70cm HT



IN BUSINESS SINCE 1976

10-390-8003 FAX 310-390-4393  
<http://www.juns.com>  
HRS M-F 10-6, SAT 10-5  
563 SEPULVEDA BLVD.  
CULVER CITY, CA 90230  
2 miles from LAX-N. on I-405  
ESPAÑOL • KOREAN**KENWOOD**

\$849.95

TS-50S Compact HF Transceiver, S/W  
ReceiverTS-60S 50MHz Transceiver, 90W  
Output \$999.95TS-870S HF Transceiver All Amateur  
Bands Call \$\$TS-570D HF Transceiver. 160-10M, 100  
Watt Output Auto Antenna Tuner, DSP,  
Scrolling Menu Call \$\$TM-742AD 2 Meter/440MHz Mobile  
w/Optional 3rd BandTM-331A 220MHz Mobile,  
25 Watts \$449.95

CALL \$\$

TM-V7A  
FM, Dual Band,  
Detachable  
Front PanelTH-G71A NEW, Dualband HT Call \$\$  
TH-235AH 5W, 2M, HT Call \$\$  
TH-22AT 2 Meter HT Call \$\$  
TH-79A(D) 2M/440MHz HT Call \$\$C188A 2 Meters  
The Slim-Line HT  
\$169.95 List \$489**YAESU**

\$1799.95

FT-920 NEW HF+6 Meters

FT-1000D Deluxe, Allband HF \$4199.95

FT-1000MP HF Base, Advanced  
Features \$2899.95

\$1969.95

FT-736R 2M/440MHz Base  
Opt. Modules for 50, 220MHz, 1.2GHZFT-8100R Compact Dual Band FM  
Mobile Call \$\$

FT-3000M 2 Meter, Mobile, 70W Call \$\$

FT-2500M 2M, FM Mobile, 50W \$289.95



\$249.95

VX-1R NEW Mini  
2 Meter/440MHz HT \$299.95FT-11RH 2M Handheld  
w/Hi Power \$249.95FT-50RD Ultra Compact  
Dualband HT \$359.95FT-51R/H 2M/440MHz  
Handheld W/5W \$489.95FNB-41 (ARIA) 9.6V 600mAh  
NiCd Battery \$35.95**STANDARD**C188A 2 Meters  
The Slim-Line HT  
\$169.95 List \$489  
• Fits In Your Shirt Pocket!  
• 5W at 12 VDC  
• 40+ Memories  
• Extended Rec. (Including AM Air Band)  
• CTCSS En/Decode

California

**800-882-1343 | 800-564-6516**

VIBROPLEX

NYE &amp; Co.

Force 12

Antennas and Systems

**KANTRONICS****butternut****DAIWA****W & W****Larsen****HUSTLER****MIRAGE****PERIPHERX****rfconcepts****GAP****TIMEWAVE** **dashcraft** **hy-gain**  
by Telex**MAGELLAN****DIAMOND** **ANTENNA****GARMIN** **TEST SYSTEMS****HUSTLER****PERIPHERX** **rfconcepts****JUN'S**

**CALL TOLL FREE**  
**(800) 292-7711 orders only**  
**Se Habla Espanol**

**NEW** **XK-700 Digital / Analog Trainer**  
Elenco's newest advanced Digital / Analog Trainer is specifically designed for school projects. It is built on a single PC board for maximum reliability. It includes 5 built-in power supplies, a function generator w/ continuously sine, triangle and square waveforms, 1560 x 1 port breadboard area. Tools and meter shown optional. Mounted in a professional tool case made of reinforced metal.

**XK-700**  
Assembled and Tested  
**\$189.95**

**XK-700-SEMI Kit**  
Assembled and Tested  
**\$174.95**

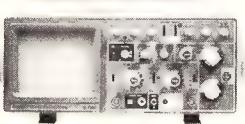
**XK-700K - Kit**  
**\$159.95**  
Made in U.S.A.

**YOUR ONE STOP SOURCE**  
**FOR ALL YOUR TEST**  
**EQUIPMENT NEEDS**

**CALL OR WRITE FOR OUR**  
**NEW FREE 64 PAGE**  
**CATALOG!**  
**(800) 445-3201**

**Elenco Scopes**

Free Dust Cover & Probes



S-1325 25MHz  
S-1330 25MHz  
S-1340 40MHz  
S-1345 40MHz  
S-1360 60MHz  
S-1390 100MHz  
DS-303 40MHz/20Ms/s Analog/Digital  
DS-603 60MHz/20Ms/s Analog/Digital

**4 Functions in One**

**MX-9300**  
**\$459.95**

**Features**

One instrument w/ four test leads and measuring systems

- 1.3GHz Frequency Counter
- 2MHz Sweep Function Generator
- Digital Multimeter
- Digital Triple Power Supply



**NEW** **Tektronix DMMs**

• 40,000 Count  
• High Accuracy  
• Tektronix Quality  
• 3 Year Warranty  
**DMM 912 \$189**  
**DMM 914 \$235**  
**DMM 916 \$275**



20MHz Sweep/Function Generator with Frequency Counter

**Model 4040**

• 0.2Hz to 20MHz  
• AM & FM Modulation  
• Burst Operation  
• External Frequency Counter to 30MHz  
• Linear and Log Sweep

10MHz - **Model 4017 \$309**

5MHz - **Model 4011 \$239**



**\$399**

**Fluke Scopemeters**

123 NEW \$950  
92B ... \$1445  
96B ... \$1695  
99B ... \$2095  
105B NEW \$2495

ALL FLUKE PRODUCTS ON SALE!!



**Technician Tool Kit**

**TK-1500**

28 tools plus a DMM contained in a large flexible tool case with a handle ideal for everyone on the go!

**\$49.95**

**Fluke Multimeters**

Model 10 S63 Model 12 S84  
Model 70II S75 Model 83 S235  
Model 73II S97 Model 85 S269  
Model 75II S129 Model 87 S289  
Model 77II S154 Model 863E S475  
Model 79II S175 Model 867BE S650

**DIGITAL LCR METER**

**Model LCR-1810**

• Capacitance 0.1pF to 20uF  
• Inductance 1uH to 20H  
• Resistance 0.01 to 2000M  
• Temperature -20 to 75 C

• DC Volts 0-200V

• Frequency up to 15MHz

• Diode A/D & Continuity Test

• Signal Output Function

• 3 1/2 Digit Display

**\$99.95**

**NEW**

**Digital LCR Meter**

**Model LCR-1810**

• Capacitance 0.1pF to 20uF  
• Inductance 1uH to 20H  
• Resistance 0.01 to 2000M  
• Temperature -20 to 75 C

• DC Volts 0-200V

• Frequency up to 15MHz

• Diode A/D & Continuity Test

• Signal Output Function

• 3 1/2 Digit Display

**\$99.95**

**Digital Multimeter**  
**Model M-1700**

**\$39.95**

11 functions including free to 20MHz, cap to 20pF, Meets UL-1244 safety spec's



**10% OFF ON ALL STANDARD AMATEUR RADIO PRODUCTS Including Accessories**

**Model AR-2N6K**

2 Meter / 6 Meter Amateur Radio Kit

**\$34.95**

**Model AM/FM-108K**

Transistor Radio Kits

**29.95**

**Model F-2850**

10Hz - 2.8GHz

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Handheld Universal Counter**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850 only)

**Dual 50uA/1MΩ Inputs, (F-2850 only)**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-2800**

1MHz - 2.8GHz

**\$99**

**Model F-2850**

10Hz - 2.8GHz (F-2850)

**Dual Input**

**\$149**

**NEW**

**F-28**

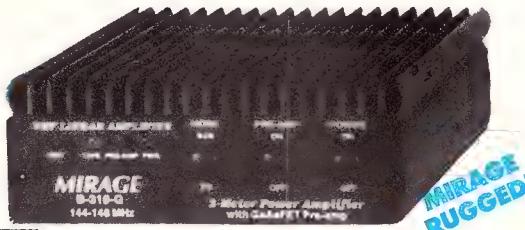
# MIRAGE...100 Watts...\$199

Boost your 2 Meter handheld or multimode (like ICOM 706) to a super powerful 100 watts... All modes: FM, SSB, CW... 15 dB GaAsFET receive preamp... Reverse polarity protection... Silent cooling fan... Free HT-to-amp coax and mobile bracket

In Stock at ham dealers everywhere!

Call your dealer for your best price

**\$199**  
B-310-G Suggested Retail



MIRAGE  
RUGGED!

operates all modes: FM, SSB and CW. It's perfect for all handhelds up to 8 watts and multi-mode SSB/CW/FM 2 Meter rigs.

It's great for the ICOM IC-706 -- you'll get 100 blockbuster watts on 2 Meters!

#### Low noise GaAsFET pre-amp

A built-in low noise GaAsFET receive pre-amp gives you 15 dB gain -- lets you dig out weak signals.

#### Fully Protected

SWR Protection prevents damage from antennas whipping in the wind. Reverse

For an incredibly low \$199, you can boost your 2 Meter handheld to a super powerful 100 watt mobile or base!

Turn "You're breaking up... Can't copy" into "Solid Copy... Go ahead."

Talk further... Reach distant repeaters... Log onto faraway packet bulletin boards.

This rugged Mirage B-310-G amplifier

## Dual Band 144/440 MHz Amp

at the same time -- just like a telephone conversation! (Requires compatible HT)

#### Mirage is the Best! Here's why...

• Automatic frequency band selection -- you'll never forget to switch bands

• Single input connector and single output connector for both bands -- easy to use with dual band radios and antennas

• First-class strip-line techniques -- superb RF performance and reliability

• Custom wrap-around heatsink -- runs cool

• Reverse Polarity Protection -- saves your amp if you connect power backward

• Automatic RF sense Transmit/Receive switch -- makes operation easy

• Low input SWR -- keeps your handheld safe from overheating

• "On Air" LEDs -- for each band

• Free mobile mounting bracket

• Free 3 foot handheld-to-BD-35 coax cable

• Small size: just 5x1 1/4x5 inches

• Full one year MIRAGE warranty

• Legendary MIRAGE ruggedness

Call your dealer today for your best price!



**\$159.95** BD-35 Suggested Retail

#### Power Curve -- typical BD-35 output power

Watts Out (2Meters)	30	40	45	45+	45+	45+	45+
Watts Out (440 MHz)	16	26	32	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7

Add this Mirage dual band amp and boost your handheld to 45 watts on 2 Meters or 35 watts on 440 MHz!

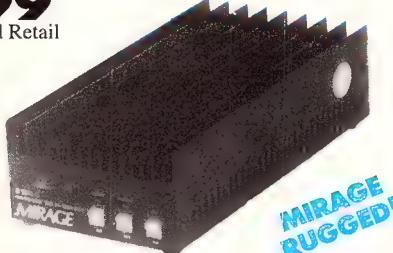
Works with all FM handhelds up to 7 watts. Power Curve chart shows typical output power.

#### Full Duplex Operation

Mirage's exclusive FullDuplexAmp™ lets you talk on one band and listen on the other band

## 160 Watts on 2 Meters!

**\$299**  
Suggested Retail



MIRAGE  
RUGGED!

The MIRAGE B-5016-G gives you 160 watts of brute power for 50 watts input on all modes -- FM, SSB or CW!

Ideal for 20 to 60 watt 2 Meter mobile or base. Power Curve chart shows typical output power.

Hear weak signals -- low noise GaAsFET preamp gives you excellent 0.6 dB noise figure. Select 15 or 20 dB gain.

B-5016-G has legendary ruggedness. We know of one that has been in constant use since 1979!

Heavy-duty heatsink spans entire length of cabinet -- prevents overheating. Power transistors protected by MIRAGE's Therm-O-Guard™.

Fully protected from high SWR and excessive input power. Has warning LED.

Has smooth adjustable Transmit/Receive switching with remote external keying.

RC-1, \$45, Remote Control. On/Off, pre-amp On/Off, selects SSB/FM. With 18-ft cable.

Draws 17-22 amps at 13.8 VDC. 12x3x5 1/2 in.

#### Power Curve -- typical B-5016-G output power

Watts Out	130	135	140	145	150	155	160	165
Watts In	20	25	30	35	40	45	50	55

**MIRAGE... the world's most rugged VHF/UHF amplifiers**

Polarity Protection can save your amp if you connect power backwards.

#### Compact but Powerful

Mirage's integrated HeatsinkCabinet™ and whisper quiet fan gets heat out fast!

The results? An ultra-compact 4 3/4x1 1/4x7 3/4 inch 2 1/2 pound amplifier that delivers a super powerful 100 watts.

#### Free Accessories

Free 3 foot handheld to B-310-G coax cable -- just plug and play! Free mobile bracket! Free rubber mounting feet for home use!

#### Plus more...

Automatic RF sense Transmit/Receive switch. Remote keying jack. LEDs monitor "On Air", high SWR, pre-amp, power. Push buttons select SSB/FM, pre-amp, power. Draws 15 amps at 12-15 VDC.

#### Full one year MIRAGE warranty

With Mirage's legendary ruggedness, you may never need our superb warranty.

## 35 Watts for 2 Meter HTs

B-34-G

**\$89.95**

Suggested Retail



#### Power Curve -- typical B-34-G output power

Watts Out	18	30	33	35+	35+	35+	35+	35+
Watts In	1	2	3	4	5	6	7	8

#### • 35 Watts Output on 2 Meters

• All modes: FM, SSB, CW

• 18 dB GaAsFET preamp

• Reverse polarity protection

• Includes mobile bracket

• Auto RF sense T/R switch

• Custom heatsink, runs cool

• Works with handhelds up to 8 watts

• One year MIRAGE warranty

#### 35 watts, FM only... \$69.95

B-34, \$69.95. 35 watts out for 2 watts in. Like B-34-G, FM only, less preamp, mobile bracket. 3 1/8x1 1/4x4 1/4 inches.

MIRAGE  
RUGGED!

#### More 160 Watt, 2 Meter Amplifiers...

B-2516-G, \$299. For 10 to 35 watt mobile or base stations. 160 watts out for 25 watts in.

B-1016-G, \$379. MIRAGE's most popular dual purpose HT or mobile/base amplifier. 160 watts out/10 W in. For 0.2-15 watt transceivers.

B-215-G, \$379. MIRAGE's most popular handheld amp. 150 watts out/2 watts in; 160 watts out/3 1/2 W in. For 0.25 to 5 watt handhelds.

Prices and specifications subject to change. © 1996 Mirage Communications

#### Call your dealer for your best price!

Nearest Dealer/Free Catalog: 800-647-1800

<http://www.mirageamp.com>

Technical: 601-323-8287 Fax: 601-323-6551

**MIRAGE**  
COMMUNICATIONS EQUIPMENT  
300 Industrial Park Road  
Starkville, MS 39759, USA



"No Compromise Communications"

Your Digital Link to the World



## SG-7200

DSP HF Modem  
with SmartEmailer™

Open Hardware and  
Software Architecture

Link to the world with SGC's reliable and efficient high speed DSP HF modem - the SG-7200. Transmit and receive e-mail via common mode carrier to any station around the globe\*, using the SG-7200, any HF radio with SITOR compatibility and your laptop computer. The SG-7200 features open hardware/software architecture and runs DOS and Microsoft windows applications.

Features include:

- Programmable DSP Coprocessor
- HDLC (High-Level Data Link Control)
- 512K upgradable FLASH
- Embedded INTEL 386EX microprocessor
- 2 Radio ports with PTT, frequency control, and bi-directional serial support.
- Alphanumeric LCD back-lighted matrix display

Mate the SG-7200 with SGC's popular SG-2000 or SG-2000 PowerTalk HF radios for advanced data and voice technology. Competitive package pricing of the SG-7200 and SG-2000 series of transceivers make this your best choice for data/voice link to the world.



standard ports on back of SG-7200



SG-2000  
standard SSB head –  
a world proven HF  
transceiver.



SG-2000 PowerTalk  
with DSP  
Rated "Best Buy" in Practical Sailor

Call Today!  
1-800-259-7331

**Internet**  
Web site  
<http://www.sgcworld.com>  
E-mail  
[SGCMKTG@AOL.COM](mailto:SGCMKTG@AOL.COM)

\*station lists available on request.

SGC Inc. P.O.Box 3526 Bellevue, WA 98009 USA  
Tel: 425-746-6310 Fax: 425-746-6384 or 425-746-7173



# KENWOOD YAESU



QUOTES & ORDERS  
800-891-9199

AZDEN  
MFJ  
CUSHCRAFT  
LARSEN  
MAHA  
MIRAGE  
KANTRONICS  
BELDEN



TECHNICAL & INFO  
717-336-6060

VISIT OUR WEB AT: <http://www.denverradio.com>

**DENVER AMATEUR RADIO SUPPLY**

LOCATED 2 MILES SOUTH OF PA TURNPIKE EXIT 21 @ ROUTE 272 & WABASH CENTER

1233 N. READING RD, STEVENS, PA 17578

MON, TUE, FRI 10AM-6PM; WED, THUR 10AM-8PM; SAT 9AM-3PM.

KENWOOD AUTHORIZED SERVICE CENTER



Chuck Burch, AH6IN. TC: Kenny Bell, KH6AFQ. Please promote ARRL membership and consider volunteering your services. BIARC had a booth at the Hawaii County Fair Sep 17-21. Hilo had mainland visitors: Jim, KC7OKZ, Carol, KC7TSX, both on the s/v "Morning Wings." Klaus-Peter DL3SJ/KB6DNJ, Bud AH6NZ, formerly Glenwood and visiting from Tampa FL. HI QRP Club had a camp/outing at Laupahoehoe Point Beach Park Sep 26-28. Participants: WH6CQA, WH6AVF, WH6XJ, KH6CC, KH6AFQ, K6FER, NH6WW, NH6WX, AH6NK, KH6AFS, AH7H, KH6DFW, KH6HDC, KH6B. Please consider participating in local nets:

Hawaii Afternoon Net	0200 UT	7088/3888
Pacific Interisland Net	0800 UT	14315
Friendly Net	1900 UT	3860
Hawaii ARES - 1st Thu	0500 UT	3905
HI QCWA - 1st Mon	0100 UT	7088

Mahalo, 73 and Aloha.

**SACRAMENTO VALLEY:** SM, Jettie Hill, W6RRF—As the year ends reflect back on the enjoyment and friendship that Amateur Radio has brought you, and resolve to put something back into it by helping your club, acting as an "Elmer," teaching classes or giving exams. K6WR & W6CF will continue as Director & VP of Pacific Div for another 2 years. The weatherman predicts heavy rains this winter, so become acquainted with your Emergency Coordinator and ARES group. They may need your help! K6HP, former editor of *Worldradio*, spoke on "State of the Art for Amateur Radio" before the Sacramento ARC. Three Sacramento Valley clubs were competing in the Calif QSO Party; they are Mother Lode DXCC, Shasta DXCC and River City Contesters. Did one of them win? Stay tuned. River City ARCS had a demonstration of QRP rigs at their meeting. RICARCS has VE tests on Dec 20—483-3293 for info. VE test in Sacto. Dec 14-383-2113 for info. Anderson VE Dec 13—call 357-4834. GEARS Dec 7-call 342-1180. Nevada County ARC Dec 13—273-0524. SEC K6BZ reports a station has been installed at CDF HQ in Redding. Jerry also set up a section-wide Simulated Emergency Test during Oct. Much action by the different ARES groups in preparing for possible flooding this winter. He also is writing a six-part series on Emergency Communications. Long time ham Harold Cobb, W6KDJ, is a Silent Key. GEARS newsletter had an excellent article on building a Delta Loop antenna by Dennis, AB6QR. The Sacramento Valley Section Net meets on 146.085+ at 8 PM, the first Sunday of each month. The latest ARRL & FCC news is given & there is a question/answer and comment period. All are welcome. Get your list in to Santa for that new rig or equipment. 73, Merry Christmas.

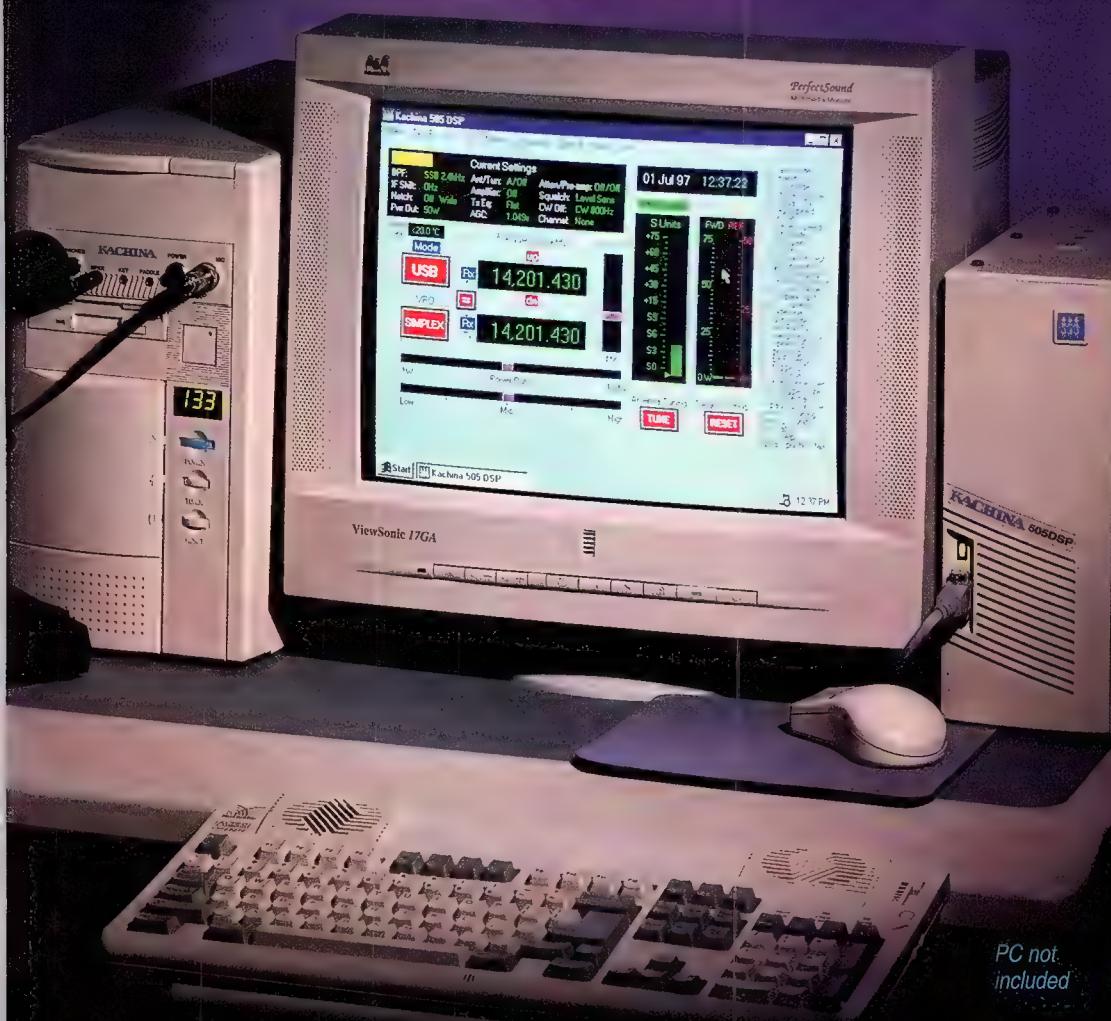
**SAN FRANCISCO:** SM, John Wallack, W6TLK—ASM: N6KM, OOC: KD6HO, SEC: WB6TMS, STM: AB6EU, TC: N1AL. New appointments: KE6FEF, EC for Arcata; K6BMZ, EC for Fortuna; KM6TE, EC for Garberville. Thanks to all ARRL members who supported me in the recent SM election. I am going to continue to emphasize and support all ARRL affiliated clubs in the SF Section. It is through our local radio clubs in providing both emergency and public service communications that we can best support our fellow hams and serve our communities. K6ZWB, Sonoma County RA, reports an excellent turnout at the annual flea market. Congrats to Willits ARS member KE6SPJ who, along with her daughter, climbed 10,457 ft Mt Lassen. KN6ZU, Southern Humboldt ARC, reports that KA6ROM, N6AFT and KE6KKJ installed a new repeater on 146.355 (103.5). KE6CQJ reports that Lake County ARS has adopted a 4 mile stretch of Hwy 29 near Lakeport. WA6MLG, KB6CJA, KD6LAG, KB6ALT, KE6HMA, K6TCP, WA6CQI and N6GJM all helped pick up litter along the hwy on a hot day. This adds new meaning to public service and an excellent idea for a ham radio club. Well done to all! WA6TVO reports that Humboldt ARC is 50 years old this year. Happy anniversary to all 120 club members! Tfc: AB6EU 272, KK1A 154.

**SAN JOAQUIN VALLEY:** SM, Donald Costello, W7WN —ASM: Mike Siegel, K16PR. ASM: Technical, John Lee, K6YK. SEC: Ernie Rader, W5NH. OOC: Victor Magana, AA6AH. Well, it seems that El Nino is the big topic of conversation these days and if predictions of a very wet winter hold up it is likely that there could be flooding again this year in the San Joaquin Valley. It is a good time for radio clubs to keep in touch with local municipalities, the National Weather Service and the Red Cross. It is also time to check out the generator in the garage and charge up those gel cells for possible action. Prepare for the worst and hope for the best. Are you ready for an extended power outage and lack of water and what about non-perishable food, etc. Think about it. If you are prepared, then you will be able to help others through Amateur Radio if the need should arise. Now that Advance license holders are applying for vanity calls, I am noticing many unique call signs out there. Some hams are picking call signs with their initials and some are just really creative. Rick McMillion (ex WB7UGZ) got his request for K6SIX. Good luck to all who request vanity call signs.

### ROANOKE DIVISION

**NORTH CAROLINA:** SM, W. Reed Whitten, AB4W—ASMs: AB4S, KE4ML, KC4ACE. SEC: K4MPJ. STM: K4IWW. ASTM: W4EAT. TC: K4ITL. SGL: K14AN. OOC: W4ZRA. PIC: KN4AQ. ACC: W4CC. Check our Section Web Site for lots of NEW information <<http://www.nccarrl.org>>. Field Day results showed many NC groups active. Orange County RA was, once again, first in 5A/Battery; Raleigh ARS was first in 7A; and Cary ARC was a very close second in 3A! The other groups that didn't score at the top of their class, were also winners. Fun and fellowship is the reward for the participants. The good public relations that Field Day gives the Amateur Radio Service is a reward that we all share. It is critical that the public perception be that Amateur Radio is an essential emergency communications resource. It is also important that Amateurs are viewed as "nice guys." Please remember, we are ALL ambassadors for Amateur Radio. If you have an Amateur Radio license plate, your courtesy on the road reflects on the Amateur Radio Service. If your call-sign is in your signature file and you are rude to others in your Internet postings, it reflects badly on all amateurs. A SPECIAL FORUM/SEMINAR, ESPECIALLY FOR CLUB OFFICERS AND ARES APPOINTEES WILL BE HELD AT THE GREENSBORO HAMFEST ON DEC 6. The discussions

# The New Approach to HF Radio!



PC not included

## The Kachina 505DSP Computer Controlled Transceiver

### Features:

- Works with any Computer Running Windows 3.1, 95 or NT
- Covers all Amateur HF Bands plus General Coverage Receiver
- IF Stage 16/24 Bit Digital Signal Processing (DSP)
- II DSP Bandpass Filter Widths from 100 Hz to 3.5 kHz (6 kHz in AM Mode)
- Band Activity Display with "Point and Click" Frequency Tuning
- On-screen Antenna "Smith" Chart, Logging Software and Help Menus
- Automatic Frequency Calibration from WWV or Other External Standard
- "Snapshot" Keys for Instant Recall of Frequencies and Settings
- Optional Internal Antenna Tuner

**The Kachina 505DSP Computer Controlled HF Transceiver** After twenty years of building commercial transceivers in Arizona, Kachina has decided the time is right for a new approach to amateur radio. The Kachina 505DSP is nothing short of a revolution in HF transceivers.

the-art DSP transceiver with the processing power and graphics capabilities of your PC and you'll soon wonder why all radios aren't designed this way. Why settle for a tiny LCD display when your computer monitor can simultaneously show band activity, antenna impedance, heat sink temperature, SWR, forward and/or reflected power and a host of other information?

**Why Use Knobs if You Have Windows?** The old-fashioned front panel has become too cluttered to be useful. Too many knobs, too many buttons. Kachina's 505DSP transceiver connects to your computer's serial port and is completely controlled under Windows™. With optional cables, the radio may be remotely located up to 75 feet away from your computer. Imagine combining a state-of-

excellent sounding receiver. Sophisticated DSP technology achieves performance levels unimaginable in the analog world. The transmitter also benefits from precise 16/24 bit processing. Excellent carrier and opposite-sideband suppression is obtained using superior phasing-method algorithms. The RF compressor will add lots of punch to your transmitted signal without adding lots of bandwidth, and the TX equalizer will allow you to tailor your transmitted audio for more highs or lows.

**Seeing is Believing**  
American-made and designed, and able to stand on its own against the world's best, the 505DSP is bound to set the standard for all that follow. But don't take our word for it. Visit our website at <http://www.kachina-az.com> for detailed specifications, to download a demo version of our control software, or to see a current list of Kachina dealers displaying demonstration models in their showrooms.

**KACHINA**  
COMMUNICATIONS, INC.

P.O. Box 1949, Cottonwood, Arizona 86326, U.S.A.  
Fax: (520) 634-8053, Tel: (520) 634-7828  
E-Mail: [sales@kachina-az.com](mailto:sales@kachina-az.com)





# QRO AMPLIFIERS™ DELIVER HIGH PERFORMANCE, SUPERIOR QUALITY, AND EXCEPTIONAL DURABILITY FOR A REASONABLE COST!

## QRO HF-1000

Price: \$1,695 US Dollars FOB Bryan, Ohio USA  
**Band Coverage:** 160,80,40,20,17,15 (12 & 10 export; also usable in U.S.A. with license)  
**Output Power:** 1000 W SSB, 800 W CW  
**Drive Power:** 90 watts for 1,000 watts output  
**Tube:** Amperex 3-500ZG triode (1)  
**QSK:** Standard Feature (Vacuum Relay)  
**Line Voltage Requirement:**  
 100/120/200/240V, 50/60Hz  
**Cabinet Size:** 18" w x 15" d x 8-1/2" h  
**Shipping Wt:** 65 lbs. UPS three cartons



## QRO HF-3KDX (UNDER DEVELOPMENT)

Price: \$3,295 US Dollars FOB Bryan, Ohio USA  
**Band Coverage:** 160,80,40,20,17,15 (12 & 10 export; also usable in U.S.A. with license)  
**Output Power:** 1500 W Continuous Carrier  
**Drive Power:** 50 watts for 1,500 watts output  
**Tube:** Svetlana 4CX1600B Tetrode (1)  
**QSK:** Standard Feature  
**Line Voltage Requirement:** 200/240V, 50/60Hz  
**Cabinet Size:** 20" w x 19" d x 8" h  
**Shipping Wt:** 100 lbs. UPS three cartons

## QRO HF-2000

Price: \$2,095 US Dollars FOB Bryan, Ohio USA  
**Band Coverage:** 160,80,40,20,17,15 (12 & 10 export; also usable in U.S.A. with license)  
**Output Power:** 1500 W SSB, 1200 W CW  
**Drive Power:** 130 watts for 1,500 watts output  
**Tubes:** Amperex 3-500ZG triodes (2)  
**QSK:** Standard Feature (Vacuum Relay)  
**Line Voltage Requirement:**  
 100/120/200/240V, 50/60Hz  
**Cabinet Size:** 18" w x 15" d x 8-1/2" h  
**Shipping Wt:** 76 lbs. UPS three cartons

## QRO HF-2500DX

Price: \$2,895 US Dollars FOB Bryan, Ohio USA  
**Band Coverage:** 160,80,40,20,17,15 (12 & 10 export; also usable in U.S.A. with license)  
**Output Power:** 1500 W Continuous Carrier  
**Drive Power:** 50 watts for 1,500 watts output  
**Tube:** Svetlana 4CX800A Tetrode (2)  
**QSK:** Standard Feature  
**Line Voltage Requirement:** 200/240V, 50/60Hz  
**Cabinet Size:** 20" w x 19" d x 8" h  
**Shipping Wt:** 100 lbs. UPS three cartons

## VISIT US ON THE WORLD WIDE WEB

<http://www.bright.net/~qrotec>

**LICENSED AMATEURS ONLY...** to request free brochures, or further details... **Call Toll Free 1-800-956-2721.** Visa/Mastercard credit card or wire transfer payment orders accepted by telephone from 9:00 am to 6:00 pm eastern time Monday thru Friday. **Export orders welcome too!** QRO Amplifiers™ are made in the USA by HAMS FOR HAMS™ and sold factory direct only. Ohio residents we pay the Ohio Sales Tax.

## WE BUILD THEM LIKE THEY OUGHT TO BE!™

**QRO TECHNOLOGIES, INC.**  
 1117 West High Street  
 P.O. Box 939  
 Bryan, Ohio 43506 USA  
 Tel: (419) 636-2721 • Fax: (419) 636-6039  
 e-mail: qrotec@bright.net

## Alpha Delta Limited Space High Performance Antennas

### • STAINLESS STEEL HARDWARE • FULLY ASSEMBLED • SEVERE WEATHER RATED COMPONENTS

**No-trap design.** Unlike trap antennas, there are no capacitors to break down under high RF voltages, and a tuner may be safely used for multi-band operation if desired.

- Direct 50 ohm feed. Tuners usually not required when operating in resonant bands.
- Full power operation.
- Uses "ISO-RES" inductors.
- Model DELTA-C center insulator with static protection now used in Alpha-Delta dipoles.

**Model DX-A** 160-80-40 Meter Quarter Wave Twin Sloper—

- The premier low frequency DX antenna.
- Combines the tremendous DX firepower of the quarter wave sloper with the wide band width of the half wave dipole.
- One leg is 67', the other 55'. Installs like an inverted-V. Ground return through tower or down-lead. **\$59.95 each**

**Model DX-B** Single Wire Sloper for 160-80-40-30 Meters—Perfect for limited space use.

- Only 60' overall length. **\$69.95 each**

**Model DX-CC** "No-Trap" 80-40-20-15-10 Meter Dipole—Can be used as inverted-V.

- Only 82' overall length. **\$119.95 each**

**Model DX-DD** "No-Trap" 80-40 Meter Dipole—Can be used as inverted-V.

- Only 82' overall length. **\$89.95 each**

**Model DX-EE** "No-Trap" 40-20-15-10 Meter Dipole (30-17-12 meters with wide-range tuner)

- Can be used as inverted-V.
- Only 40' overall length. **\$99.95 each**

At your Alpha Delta Dealer or add \$5.00 for direct US. orders. Exports quoted.

**ALPHA DELTA** COMMUNICATIONS, INC.

P.O. Box 620, Manchester, KY 40962 • (606) 598-2029

fax • (606) 598-4413

Radio—“The Original Information Superhighway”

—Alpha Delta Makes it Better

will include: working with volunteers, improving your organization, using Internet and other means to communicate with your members and the public, and working closer with other Amateur and government groups. Our ACC, SEC, PIO, and several emergency agency personnel will lead the group discussion. This will be a first—don't miss it. We also plan to have one of the new North Carolina Em Mgt Amateur Radio vans at this hamfest. These vans illustrate the high esteem and trust that Amateur Radio has earned in North Carolina. We are fortunate to have an activity we enjoy that allows us to make a real contribution to the well being of our communities and state. We can hear the results of our SKYWARN, HAMWATCH, and disaster communications. We can see the reaction in the TV and newspaper coverage of these activities. We can ALL be proud that we are amateurs. Our thanks to all the many volunteers in the Field Organization and our Amateur Radio clubs who make this possible. TIC: W4IRE 207, W4EAT 155, K14YV 144, K4IWW 110, K4CWZ 91, AB4E 85, AE4EC 74, N4UE 68, KB4FWL 63, WA4SRD 44, KA4IF 43, AB4W 24, K4DDY 41, AF4NC 36, KD4RYE 35, KE4KHC 34, KE4JH 29, KE4JWL 28, KE4JWL 26, W4DAC 24, N5XUJ 16, W4DYZ 16, WD4MRD 14, KE4YMA 13, NT4K 12, N4JTG 11, K4ROK 8, KT4CD 8, KF4PAK 7, KR4ZJ 7, KA4KTU 6, KF4PAK 5, KE4SMJ 4, KB4VZC 3, KF4PUX 3, N2LJE 3.

**SOUTH CAROLINA:** SM, Les Shattuck, K4NKG—I have enjoyed visiting the clubs around the upstate. My last visit was to the Spartanburg ARC. I am now a little more polished on my ARRL presentation, and I hoped they enjoyed it. I have a new Affiliated Club Coordinator. Please welcome Jim Brackett, AE4ZJ, from Spartanburg. Jim holds a Doctorate in Education and will be an asset to the leadership team. Local 2 meter net managers please contact me or STM Johnny King, WA4UGD. We would like to include your check-in and traffic counts in our monthly report. Also, don't forget the 3.915 South Carolina SSB net at 7 PM. This is an excellent way to pass your report to Johnny. The Union ARC is holding a hamfest on Dec 13, and I'll be on hand to greet members so please stop by and say hello. TIC: KT4SJ 142, W4DRF 79, KA4LRM 65, KT4P 41, WA4UGD 37, K4VIA 23, KA4SLQ 16, K4NKG 14, W4CQB 13, WA4HNA 6, K4ZJ 5, K4QSY 4, KB4DZ 3.

**VIRGINIA:** SM, Chris Wright, KD4TZN—STM: N4GHI. SEC: K4EC. ASEC: N4SCK. ASM: AF4CD. ACC: KA4YU. SGL: W4UMC. PIC: N0RDO. TC: W3EDR.

VSBN	72	166	225	KD4TZN
VNE	114	243	358	N4GHI
VNL	41	149	201	WD4MIS
VLN	85	178	389	N3PDK

### 2-meter nets

NVTN	60	375	103	KR4MU
------	----	-----	-----	-------

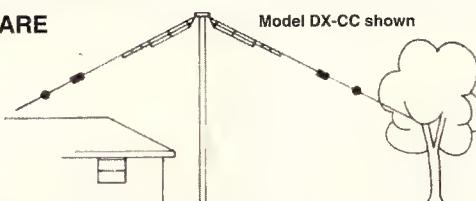
STARES	82	705	1027	KD4JMA
--------	----	-----	------	--------

TIC: K4DOR 386, N4GHI 338, K4MTX 199, KQ4ET 197, KR4MU 174, W4JLS 138, KF4HJW 129, N6ANQ 120, WB4ZNB 104, W4UQ 95, K4DFUN 90, N4ABM 84, AA4GL 78, KF4LBD 71, WB4FLT 67, K4YVX 66, N3PDK 65, KE4YXW 63, AA4AT 49, W4HU 46, KN4US 46, KE4AZL 39, K4DUS 36, K4DZT 36, K4DJMA 27, K0IBS 27, KE4PAP 26, WD4MIS 25, K4IX 22, K4NOH 20, W4YE 19, W4HDW 19, K4BGZ 18, KT4CB 16, WB4UHC 12, W3AT 11, K4BAU 10, W4TZC 9, W4M 9, WB2KQG 8, KU4CE 8, KE4NNY 6, K4JMN 5, K4OQG 5, AF4CD 4, K4GAG 2, N4FNT 2, W4IN 2, KE4HFX 2, KE4KET 2, WB4K1T 1.

**WEST VIRGINIA:** SM, O. N. (Olie Rinehart), WD8V—STM: WD8LDY. SEC: K8QEW. ASEC: KA8ZQO. SGL: K8BS. TC: K8LG. OOC: N8OYV. ACC: WD8MKS. Digital: K8MHR. APRS: W8XF. The West Virginia Section and I, as Section Manager, started a new term as of October 1st, and I am very pleased that no operator on the staff requested to be replaced! WD8LDY, Dave Allen, is the newest of the field appointees as our Section Traffic Manager and digging in with gusto to perform his duties and functions. Looks like Dave will also be a welcome backup for Phil and the section as well as 8RN digital traffic functions. "The Mill," according to the treasurer's report was a financial success (paid all expenses) without dissolving the bank account. Administratively, it did perform well. There is still a nagging troublesome problem of slow growth or, in fact, lack of growth in attendance. Next State Radio Council meeting is to be January 17, 1998. In my travels around the state and on the air, both HF and UHF/VHF, I hear a great deal about ARES/RACES and ongoing and upcoming Simulated Emergency Tests (SET). I am real pleased with the continued and renewed improvement in our performance in these activities to assure that Amateur Radio will continue to provide this very valuable public service function. Please report in some detail and in particular, man hours involved in these SETs. If you discover a new problem unique to your situation and a solution, let us know. TIC: KA8WNO 248, W8JWVX 152, WD8V 108, WD8DHC 83, K8QEW 69, W8FZP 35. WVFN 1109/133/18/19; WVMN 555/19/08/01; WVNE 1109/133/18/19; WVN 214/54/04/58; ARES/RACES 39 nets 1068/67; Digital 03/43/00:14.

### ROCKY MOUNTAIN DIVISION

**COLORADO:** SM, Tim Armagost, WB0TUB—ASM: Jeff Ryan, N0WPA. SEC: Mike Morgan, N5LPZ. STM: Mike Stansbury, K0TER. ACC: Ron Deutsch, NK0P. PIC: Vacant. (Call Tim if you're interested!) OOC: Karen Schultz, KA0CDN & Glenn Schultz, W0IJR. SGL: Mark Baker, KG0PA. TC: Bob Armstrong, AE0B. BM: Stan Morris, N0JQO. By now, all Colorado ARES districts should have held their SETs. ECs, don't forget to submit your reports to Mike, N5LPZ, and also to HQ. As we approach 1998, it's also time to prepare and submit Annual Reports. How many newly licensed amateurs (1 year or less) are in your organization? How about youngsters? Let me know your success stories. If you're on the Front Range, check out a new net on the PPFFMA 146.97(-) machine—an "Elmer" Net at 19:30L on Mondays. There are always Field Services appointments available: contact the SEC or your local EC if you're interested in Official Emergency Station; contact Mike, K0TER, for Official Relay Station; and Stan, N0JQO, for Official Bulletin Station. Other appointments are also available—contact Tim or me to help; let's keep Colorado the active section it is. 73, de N0WPA. NTS traffic totals: N0UOD 30. Colorado Amateur Weather Net (CAWN)



**DIAMOND**  
ANTENNA

# DIAMOND ANTENNAS— THE STANDARD BY WHICH ALL OTHERS ARE JUDGED

*Acclaimed as the technological leader in single & multiband antennas*

- Wide-band Performance
- Factory Adjusted—No Tuning Required
- Highest Gain
- UPS Shippable
- High Wind Rating
- Fiberglass Radome
- DC Grounded
- Stainless Hardware

## X500HNA

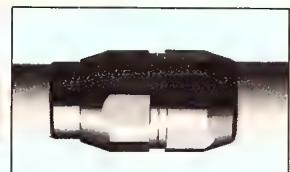
### RUGGEDIZED BASE/REPEATER ANTENNA



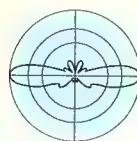
COAX CONNECTION  
AT BASE END



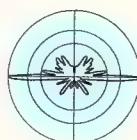
HEAVY DUTY BASE/  
RADIAL ASSEMBLY



STRONG JOINT  
COUPLINGS

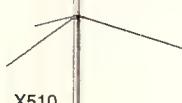


147MHz

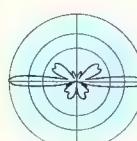


445MHz

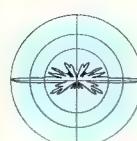
Radiation patterns for  
X500HNA/X510MA/X510NA



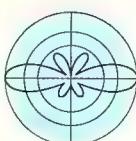
X510



U-300A 440MHz



U-300A 1200MHz



F-22

GH62

## DIAMOND Mono-band Base/Repeater Antennas

MODEL	BAND (MHz)	GAIN (dBi.)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No Ic)
DPGH62 <sup>1</sup>	50		200	UHF	21.0	78
F22A	144		200	UHF	10.5	112
F23A	144		200	UHF	15.0	90
F142A	222		200	UHF	6.0	110
F718A <sup>2</sup>	440		250	N	15.0	110
F1230A	1240		100	N	10.5	90

## DIAMOND Dual-Band Base/Repeater Antennas

MODEL	BAND (MHz)	GAIN (dBi.)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No Ic)
X50A	144/440		200	UHF	5.6	135
X200A	144/440		200	UHF	8.3	112
X300A	144/440		200	UHF	10.2	112
X510NA <sup>3</sup>	144/440		200	N	17.2	90
X510MA	144/440		200	UHF	17.0	90
X500HNA	144/440		200	N	17.8	90+
X700HA	144/440		200	UHF	24.0	90
X2200A	144/222		150	UHF	11.5	112
U200A	440/1240		100	N	5.9	135
U300A	440/1240		100	N	8.3	110

## DIAMOND Tri-Band Base/Repeater Antennas

MODEL	BAND (MHz)	GAIN (dBi.)	WATTS	CONN.	HT. FT.	RATED WIND MPH (No Ic)
U5000A	144/440/1240		100	N	5.9	135
V2000A <sup>1,4</sup>	50/144/440		150	UHF	8.3	110
X3200A <sup>5</sup>	144/222/440		100/200	UHF	10.5	112
X6000A	144/440/1240		100/100/60	N	10.5	112

BAND: 144=144-148MHz., 222=222-225MHz., 420=420-430MHz.  
430=430-440MHz., 440=440-450MHz., 1240=1240-1300MHz.

Mast requirement: 1.4"-2.4".

<sup>1</sup> 50 MHz antennas are adjustable

<sup>2</sup> F-718A: 440-450MHz., F-718J: 430-440MHz., F718L: 420-430MHz.

<sup>3</sup> X510NJ: 144-147/430-440MHz.

<sup>4</sup> 1/4λ rated in dBi.

<sup>5</sup> 2m: 146-148





182 North Maple - P.O. Box 73 - Watertown, SD 57201

WE WANT TO  
BE "YOUR"  
RADIO DEALER.  
Write for our  
Updated Used  
Equipment  
Listing!

# YAESU High Frequency Transceivers!



Collins  
Mechanical  
Filters and  
EDSP spell  
value!!

## YAESU FT-1000MP

The Yaesu FT-1000MP with DSP gives you the best in HF operation. Features include Enhanced Digital Signal Processing (EDSP), Shuttle-jog Rapid Tuning Enhancement, Directional Tuning Scale for CW/Digital mode and clarifier offset display, Dual in-band RX with separate S-meters, Selectable antenna jacks, Collins SSB Mechanical filter built-in, 500 hz CW Collins mechanical filter optional, Selectable cascaded crystal and mechanical IF filters (2nd and 3rd IF filters), User-programmable Tuning Steps w/0.625Hz high resolution low-noise DDS circuit, Custom Feature Set-up via New Menu System, Adjustable TX output power 5-100 watts, True base station operation with built-in AC (100-117 or 200-234 VAC + or - 10%, 13.5 volt DC input.

## Yaesu FT-920 with Digital Signal Processing!

Hi-frequency operating you  
never thought possible!



- HF+50MHz with 100 watts output on all bands / MOSFET PA
- High Performance 33MIPS Digital Signal Processing-all modes
- DSP Speech Processor for increased average power output
- Voice pattern Contour Choices
- Automatic Seeking DSP notch filter & noise reduction
- Built-in High Speed automatic antenna tuner - works thru 50MHz
- Auto Notch/Noise Reduction Control

# Sales Order Line 1-800-927-4261

## Technical & Info.

(605) 886-7314

FAX (605) 886-3444  
(Internet Connections)

E-Mail - [burghart@daknet.com](mailto:burghart@daknet.com)

Try our all new catalog  
on our HOME PAGE

<http://www.burghardt-amateur.com>

HOURS: MON. - FRI. 8-5p.m.;  
SAT. 9-1 p.m.  
CLOSED SUNDAYS/HOLIDAYS

CALL or WRITE TODAY  
for our "TOP-DOLLAR"  
TRADE ALLOWANCE ON  
YOUR "GOOD" and  
CLEAN" LATE MODEL  
HF, VHF, UHF, and  
Receiver EQUIPMENT.

73 from All the Gang

Stan	WØIT	Jim	WBØMJY
Darrell	WDØGDF	Tim	WDØFKC
David	KAØJDN	Marty	KBØIOW
Shane	Technician	Steve	Shipping
Rochelle	Receptionist	Lorie	Bookkeeping
Michael	Apprentice/Tech		



Give our  
Friendly  
sales staff  
a Call for  
all your  
**HAM  
RADIO  
Needs!**

## The POWER STATION

- 12 Volt x 7 Amp/Hr Gel Cell Battery
- 12 Volt Cigarette Lighter Outlet
- 3, 6, & 9 Volt Power Jack
- Built in Voltmeter
- Car & Wall Charger w/Auto shutoff
- 2 Hidden Terminals for Hardwiring provide up to 90 Amps (short circuit)
- Only \$49.95+ \$10.50 S&H



## The SUPER STATION



- 11 Amp/Hr Gel Cell
- Jumper Cables provide up to 150 Amps SC
- Cigarette lighter output
- Charge Indicator meter
- Car & Wall Chargers w/Auto shutoff
- Only \$94.95+ \$14.50 S&H



## The MEGA STATION

- 17 Amp/Hr Gel Cell w/Heavy Duty Jumper Cables provide up to 300 Amps SC
- Cigarette lighter output
- Charge Indicator meter
- Car & Wall Charger w/Auto shutoff
- Only \$129.95+ \$16.50 S&H

## SGC Inc. MADE in USA

SG230 Antenna Coupler  
\$425 + \$12.50 S&H

Buy SGC from us & you're guaranteed the  
BEST PRICE & 5 YR WARRANTY



## 12VDC to 110VAC INVERTERS



- Modified Sine Wave
- Great w/ the POWER, SUPER or MEGA STATION
- \*-\$10.50 S&H \*\*-\$12.50 S&H

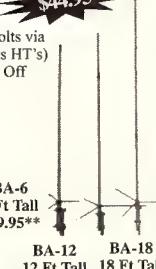
Model	Cont. Pwr	Peak Pwr	LxWxH	Price
PC140	140 Watts	200 Watts	5.1" x 3.5" x 1.5"	\$44.95*
PC300	300 Watts	500 Watts	5.6" x 3.8" x 1.3"	\$44.95*
PC500	500 Watts	800 Watts	14.2" x 6.3" x 2.6"	\$129.95*
PC1000	1000 Watts	2000 Watts	12.5" x 9.5" x 3"	\$275.00**
PC1500	1500 Watts	3000 Watts	16.2" x 9.5" x 3"	\$425.00**

To Order: Phone or E-Mail for Credit Card or COD, or Mail Check or Money Order with your Name, Call Sign, UPS-able Address, & S&H to:

## THE HAM CONTACT

INFO 714-901-0573 • ORDERS 800-933-4264 E-Mail: N6YYO@SPRNET.COM or FAX 714-901-0583

For Literature on Antennas, HT & Gel Batteries, Inverters, Power Supplies, etc., Send a large SASE with 3 stamps



**BASE  
ANTENNAS**  
2m/440



## CL555 Power Supply & Flashlight

- 2 Amp/Hr Gel Cell Battery
- Light turns on during power failure
- 12 Volt Cigarette Lighter Power Outlet
- Shoulder Strap & Jumper Cables
- Provides 1.5, 2, 3, 4, 5, 6, 7.5, 9, & 12 volts via supplied 4-way coaxial plug (used by most HT's)
- Chargers for Wall & Car with Auto Shut Off
- Spare bulb
- Only \$44.95+ \$8.50 S&H

## SOLAR CELLS

All Wattages & Sizes,  
Rigid or Flexible

- Rigid 11 Watt \$169\*
- Flexible 11 Watt \$179\*
- Flexible 22 Watt \$239\*\*
- Rigid 22 Watt \$209\*\*
- Rigid 32 Watt \$289\*\*\*
- Rigid 42 Watt \$449\*\*\*
- Rigid 64 Watt \$449\*\*\*
- Flexcharge 12Vx7 Amp Charge Controller \$59.95
- All units have diodes for partial shade
- Flexible units also have reverse blocking diodes
- \*-\$10.50 S&H \*\*-\$12.50 S&H \*\*\*-\$16.50 S&H

**BASE  
ANTENNAS**  
2m/440

A QST Advertiser  
Since 1925  
AMERICAN MADE

**VIBROPLEX**  
"the oldest name in amateur radio"



Get Yours In  
Time For Christmas!

The Deluxe Straight Key



The Deluxe Double Key



"Since  
1890"

This New Key features a heavy steel base, same size as the Iambic and Vibrokeyer. It is a perfect key for your station. Same lever shape as the classic J-38. Available in three models: Standard, Deluxe & Gold.

Other great gift items also available, Vibroplex 100th Anniversary Book, Keys II The Emporium, Dust Covers, Parts and parts list for all current models, etc. Write or see your local dealer. VISA, Mastercard and Amex accepted.

The Vibroplex Company, Inc., 11 Midtown Park, E., Mobile, AL 36606  
Toll Free 1-800-840-8873 FAX 1-334-476-0465 email: w4oa@vibroplex.com

## New! International Morse Code Practice Audio Compact Discs

### "Copy This and Pass"™ CD's

Three CD's to help learn the art of copying Morse code at home or while traveling in your car. 5 wpm disc teaches the code with left channel voice assist. 13 wpm and 20 wpm build proficiency and skill in higher speed operation. All are in stereo. Each disc can stand on its own.

#### Features and benefits:

- Nearly 74 minutes of audio practice.
- Nearly perfect computer generated and DSP filtered Morse code.
- Letters, Numbers, Punctuation, Groups, Words and Prosigns.
- Printed content/answer keys included with each audio CD
- Farnsworth Spacing utilized for better recognition and speed.
- Use "random" or "mix" on audio CD player for selection variety
- 5 words per minute CD has 60 tracks (Green)
- 13 words per minute CD has 94 tracks (Yellow)
- 20 words per minute CD has 96 tracks (Red)

Each audio CD costs \$10.00 or get all three for just \$25.00 plus \$5.00 shipping per order. We accept checks, Mastercard, Visa or Discover. Satisfaction is always guaranteed or your money back!



**BUCKMASTER**

619 Jefferson Highway  
Mineral, VA 23117



800:282-5628 • 540:894-5777\* (fax) 540:894-9141

e-mail: info@buck.com

## LOGGING PROGRAM

## PROLOG

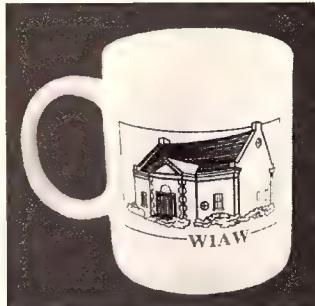
## QSL DATABASE

The renowned logging program and QSL Route database for PC's. Maintains 36 logbooks, with award tracking for DXCC, WAC, WAS, WAZ, WPX, IOTA, Countries and 16 user selectable awards. All major CD-ROM databases are supported, automatic rig control, PacketCluster™ alerts you on new ones. Logbook can be indexed and displayed by most log entry fields. Single and multi-QSO QSL label printing including a special SWL format. Multi-label laser sheets supported. A comprehensive QSL route database with over 60000 routes is available as an integral or stand-alone product. QSL stand-alone: \$23. Logger: \$49. Both: \$64, Int'l add \$3. QSL database update subscription (6 issues) \$36, Int'l \$48. RS-232 interface for all model rigs no ext. power required \$47.95 VISA, MC, AMEX accepted.

## DATAMATRIX

5560 Jackson Loop NE Rio Rancho, NM 87124  
Info Line: (505) 892-5669 Orders Only: 1-(800)-373-6564  
E-Mail: prolog@rt66.com Web: http://www.qth.com/prolog

**A great  
gift  
idea!**



**The ARRL Coffee Mug.** ARRL  
Order # 5951. Retail \$7 plus \$3 for  
UPS shipping and handling.

Call us toll-free right now at:  
**1-888-277-5289** 9 AM-5 PM  
Eastern time

225 Main Street  
Newington, CT 06111-1494

tel: 860-594-0250 fax: 860-594-0303  
e-mail: pubsales@arrl.org  
World Wide Web: http://www.arrl.org/

**VI-CON**  
Visual Conception, Inc.  
"The Greatest Custom Color QSL Cards in the World!"

500 Full Color  
QSL Cards

**5.89.95**



Quantity Discounts Available

Photo QSLs Color Text  
Computer Design 3D Graphics

For free Info. & Samples call 24 hr. Toll Free

**1 - 8 0 0 - 8 6 9 - 7 5 2 7**

or write to: **VI-CON**

P.O. Box 10013  
Kansas City, MO 64171-0013 USA

## ANTENNAS ARE US

1-888-527-2300

### LARSEN

Under new management

Family owned and operated

Amateur • Commercial

-Full Line of

Larsen products

-We also carry other

amateur brand antennas

E-mail: pharley@writeme.com

3625 River Drive, Columbia, SC 29201



The Original Dual Hybrid  
For Four Square Arrays  
Prices start at \$319

**ComTek Systems**

P.O. Box 470565, Charlotte, NC 28267

Tel: (704) 542-4808 FAX (704) 542-9652

e-mail: comtek4@juno.com



**ComTek Systems**

# YAESU

Call, write,  
or email for a  
FREE catalog

Send \$2 for Express service



## FT-920

IF + 50 MHz with 100 Watts Output on all Bands. High Performance 33 MIPS\* Digital Signal Processing (DSP) in all Modes with one touch control. New Design MOSFET PA Finals. Built-in High Speed Auto Antenna Tuner including 50 MHz Antenna Tuner works on both RX & TX) Auto Notch/Noise Reduction Control Omni-Glow Dual Display with Twin VFO Knobs Simplified Tuning with Shuttle Key Control Digital Voice Memory System Separate FET RF Amplifier for High & Low Bands Quick Memory Bank (QMB) Instant Frequency Memory System High Resolution DDS Tuning Built-in Electronic Keyer (Message Memory Keyer) Built-in RS-232C Level Converter



## VX-1R

World's smallest Dual-band Handheld. Super-wide VHF / UHF Multi-band Receive. 290 Memory Channels in 9 Groups. 6 Character Alpha-Numeric Display. Built-in CTCSS Encode/Decode. Built-in DCS Encode/Decode. Back-lit Keypad and LCD Display. 500mW Power Output ( 1W with supplied AC Adapter ). Dual Watch Feature. Built-in CTCSS/ DCS Tone Search Feature. Smart Search Function. One Touch ARTS ( Automatic Range Transponding System ). AM Air-Band Receive. Lithium Ion Battery, AC Adapter/Rapid Charger. Size H81 x W47 x D25 mm. Weight 125g with Antenna and Lithium Ion Battery



## FT-1000MP

EDSP, Dual in band receive, Selectable antenna jacks, Collins SSB Filter built-in



## FT-900CAT

All Mode HF Transceiver w/Collins SSB Filter. Direct Digital Synthesis (DDS). Built-in CTCSS for 10m FM



## FT-8100R

Compact Dual Band Mobile. 110 Memory Channels. Enhanced Smart Search. Crossband Repeat. 1200/9600 bps Packet Compatible

## FT-2500M

2m FM 5/20/50 Watt Mobile. Omni-Glow LCD. Back lit DTMF Mic



## FT-51R

2m/440mhz HT, V+V U+U V+U receive, Spectroscopic



## FT-11R

2m HT, AM aircraft rx 110-136mhz CTCSS enc



## FT-50R

2m/440mhz HT, Wide Multi-band rx, MIL-STD 810 rated

## FT-10R

2m HT, Dual watch with dual display

We carry many other Yaesu models.  
Please call for details.

# R&L Electronics

1315 Maple Ave HAMILTON OH 45011

**(800)221-7735** (513)888-6799 Local/Tech  
(513)888-6744 Fax

<http://rlradio.com> [sales@rlradio.com](mailto:sales@rlradio.com)

## Customer

## Appreciation Day

Saturday December 6, 1997 10AM - 4PM

Manufactures attending:

**ADI, Icom, Kenwood, Standard, Valor, Yaesu, and more!!**



## GARMIN GPS38

The GPS 38 features easy, one-thumb operation and weighs only 9 ounces. There's a retatable trip odometer, graphic compass and highway steering guidance. It features 250 waypoints and 20 routes to give you the navigation capability you need. Use moving map plotting to view your movement, even after dark with our backlit LCD display. And it provides up to 20 hours of use on a set of 4 AA batteries. GPS Navigation doesn't have to be expensive, just accurate and easy to use.



**\$138.95**



## MAGELLAN GPS-2000

Takes you anywhere you want to go and back again with the push of a button. Great for saving fishing holes, trailheads, campsites, and scouting locations. Four easy to understand graphic navigation screens to guide you to your next adventure. Displays distance to go, direction, time to go, speed, course correction and other data. 100 user-entered landmarks, 1 reversible route of up to 29 legs. Displays position information in Latitude/Longitude, or UTM coordinates. Up to 17 hours continuous battery life on 4 AA alkaline batteries.. Hand-held, lightweight, only 10 ounces

6.6" H x 2.3" W x 1.3" D

**\$138.95**



## ADI Communications

Tx: 144-148 and 430-450 Mhz, Rx: 108-174, 400-470, and 900-985 Mhz. True dual band radio, Simultaneous VHF/UHF receive, 200 memory channels, Crossband repeater mode, Alphanumeric display, CTCSS encode/decode, DTMF encode/decode, CTCSS tone scan, Wireless cloning, 10 DTMF autodialer memories, Auto power off and battery save, Battery voltage meter, PC programmable.

## AT-600/HP

Tx: 144-148 and 430-450 Mhz, Rx: 108-174, 400-470, and 900-985 Mhz.

True dual band radio, Simultaneous VHF/UHF receive, 200 memory channels, Crossband repeater mode, Alphanumeric display, CTCSS encode/decode, DTMF encode/decode, CTCSS tone scan, Wireless cloning, 10 DTMF autodialer memories, Auto power off and battery save, Battery voltage meter, PC programmable.



## ICOM IC-706MkII

Enhanced 0.03-200Mhz broadband all mode receive. Slots for 2 optional crystal filters. Tone squelch available (option UT-86 required). Sub dial

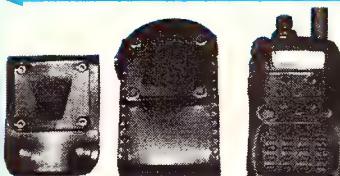
for easier access to RIT / second VFO. 20 watts on 2 meters. Individual band change key. Crossband split Band stacking register memorizes preamp/attenuator settings and tuner on/off condition as well as frequency and mode. "S" menu has 3 band quick access. Large speaker. High quality transmit audio. Quiet cooling fan

## KENWOOD

144/440Mhz FM Dual Bander. 6W VHF, 5.5W UHF at 13.8VDC. PC Programmable. 200 memory channels with alphanumeric display. MIL-STD 810E (rain & shock) CTCSS tone scan. Wide range coverage.

The TH-G71A has not been approved by the FCC. This device is not, and may not be, offered for sale or lease, or sold or leased until the approval of the FCC has been obtained. Pending approval(10-97)

## TH-G71A



## Hard Leather Case for your

**FT10R or FT50R**

**\$29.95**

Also fits Vertex  
VX-10 w/FNBV47

# A NEW CONCEPT IN FILTERS

## Hi-Q Common-Mode™ Filter

### CF5KV

5KW Continuous

PRICE \$139

Made in Japan



## Miraculous effect for any RFI...

Add our CF250E/CF5KV to the transmission line it will effectively cut the common-mode noise which Lowpass filter never cut and reduce interference.

- Attenuation(common-mode): -50~ -60dB Below 250MHz
- Choking impedance(Ohms): 1.1~5.7K
- 1.8 to 54MHz
- 50 Ohms
- SO-239(Normally) or N Type
- Weight: 0.5lb(CF250E)/1.3lb(CF5KV)

North American Dealer OB Communications 888-301-8198

 **RF Inquiry** INC.

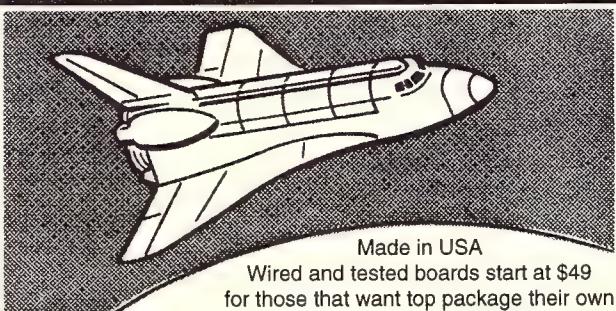
1-11 Gakuen-Cho, Gifu-City, 502 Japan

Tel 81-582-95-0582 Fax 81-582-95-0599

E-mail: [info@rfinq.com](mailto:info@rfinq.com)

## AMATEUR TELEVISION

Web site: [www.hamtv.com](http://www.hamtv.com)



Wired and tested boards start at \$49  
for those that want top package their own

## SEE THE SPACE SHUTTLE VIDEO

Many ATV repeaters and individuals are re-transmitting Space Shuttle Video & Audio from their TVRO's tuned to GE-2 (85W) transponder 9 vertical. Others may be re-transmitting weather radar during significant storms or home camcorder video. If it is being done in your area on 420 MHz - check page 577 in the 97-98 ARRL Repeater Directory or call us, ATV repeaters are springing up all over - all you need is the TVC-4G ATV 420-450 MHz downconverter, TV set to ch 2, 3 or 4, and 70cm antenna (you can use your 435 Oscar beam). We also have equipment for the 902-928 & 1240-1300 MHz bands. In fact we are your one stop for all your ATV needs and info - antennas, amps, transmitters, etc.

Hams, call for our complete 10 page ATV catalogue!

CALL (626) 447-4565 M-Th 8AM - 5:30 PM PST.

**P. C. ELECTRONICS**

2522 S. PAXSON Lane ARCADIA CA 91007

## Low Cost Start



**Model TVC-4G**  
ATV Downconverter  
tunes 420-450 MHz to ch 3  
Only \$89

TVC-9G 900 MHz \$99

TVC-12G 1200 MHz \$109

Get The  **ATV Bug!**



**Companion TX70-1b**  
1.5Watt ATV  
TRANSMITTER  
only \$299

**Buy both, for \$359  
and save \$29**

**Full color & sound**

**Plug in your camcorder,  
antenna & 13.8 Vdc @ 1A**

**VISA, MC, UPS COD**

Email: [tomsmb@aol.com](mailto:tomsmb@aol.com)

24 hr FAX (626) 447-0489

Tom (W6ORG) & MaryAnn (WB6YSS)

presidents—please put me on your mailing list or better yet e-mail list. Address on page 12. Alford Memorial ARC re-elected its entire officer corp: pres KD4HPD, vp W4EPI, sec KS4JR, treas KA4IAO, trustee NZ4A. It's the Christmas season this month. May you all have a merry and safe one. Tfc: K5TF 292, K1FP 168, AD4KA 109, KA4HHE 83, WB4GGS 74, WU4C 6.

**NORTHERN FLORIDA:** SM, Rudy Hubbard, WA4PUP—ASM: N4ADI. ASM- Youth: KO4TT. ASM-APRS: WY80. ACC: W4UE. BM: N4GMU. OOC: WB4GHU. PIC: KF4FHC. SEC: WA4NDA. SGL: KC4N. STM: WX4H. TC: KO4TT. Packet: N4GMU. The SET appears to have been successful. The Northern Florida Section did not conduct a section wide SET, but left the DECs and ECs to conduct a test in their area. However, the section did pass traffic to the SEOC, thru the W4MLE station using the SITREP procedure. The APRS system was used with digipeaters, from some of the districts to the Capital District. This was the first time to test this procedure. I have noticed some of the club newsletters have started including their e-mail address with some including the members e-mail address. The clubs are invited to send their address to both the ACC, and PIC. These individuals are anxious to assist you in any way they can, and the use of e-mail can be of great help. News concerning tower restrictions are much better. Polk County, Pasco, Osceola, Clay, and Orange Park have been successful in getting the counties to exempt the amateur tower and antennas from their planning and ordinance laws. W4UE, our ACC, will send anyone the Clay County version to use as a guide to assist you in the event your county is trying to pass restrictions. FYARC (Florida Youth Amateur Radio Clubs) has a newsletter HAMLET. Bruce Reid, WB9SHT, and Phillipian West, KA4FZI, are busy working with the youths in Florida. They also represent both sections, and the clubs are encouraged to contact them so they may assist you in forming clubs in the schools. The ARRL National Convention has been reported as highly successful in Jacksonville. The group in Jax certainly put forth a lot of hard work. I'm sure all join me in congratulations and thanks for a job well done. ARRL has requested FCC to authorize a new enforcement procedure for rules violations (RM-0150). It would allow ARRL to take complaints of serious rules violations directly to the FCC's Administrative Law Judges and to bypass tedious administrative process through the FCC's Wireless Telecommunications Bureau. Wishing each of you the best Holiday Season. 73, Rudy, WA4PUP. Tfc: KE4DNO 451, WA4NDA 259, NR2F 222, WA4PUP 148, KE4OAV 138, AD4DO 132, AD4BL 131, KN4NFP 115, W5MEN 112, KD4SIV 66, KD4TOK 64, KS4FB 58, KS4DW 57, AB4PG 49, KE4SCU 38, NOZ0 36, KB4DCR 33, W4KIX 29, N4JAQ 29, KC4FL 21, WA4EYU 16, KF4ZTP 15, WB2IM0 15, KE4LTS 13, AD4QH 9, KM4WC 9, KJ4HS 8, KF4QZJ 8, W8IM 7, KF4TQX 4, WX4J 3, KE4BM 2, KF4GUA 1.

**SOUTHERN FLORIDA:** SM, Robert "Rip" Van Winkle, AA4HT 941-853-1400—ASM: KA4FZI, 941-574-3467. ASM for Youth Activities: WB9SHT 407-336-5608. STM: WV5Z, 407-496-5257. SEC: W4SS 561-967-1477. Asst SECs: WB2WPA 941-775-2397, KD4AGR, 954-748-0775. TC: KI4T, 954-791-4275. BM: WA4EIC, 941-543-4853. PIC: WA4ATF, 813-733-9441. OOC: WB4GHU, 941-647-1415. ACC: WB3BLW, 813-541-2895. SGL: KC4N, 904-385-5924. Pkt Mgr: KB4VOL, 407-546-2532. It was great to see so many folks at the Melbourne Hamfest. While the forums were not as well attended as last year, there was excellent participation and feedback from those folks that did attend. Some of the lack of attendance may be due to the scheduling of this year's forums before lunch while the last couple of years the forums have usually been scheduled after lunch. Frank Butler, W4RH, Director SE Division and Evelyn Gauzens, Vice Director SE Division, conducted a very interesting and active ARRL Forum. A wide range of subjects were covered and some generated considerable discussion from those in attendance. One of the subjects covered was the idea of pursuing with the state legislature the idea of a special license plate for Amateur Radio operator's vehicles. The plate would probably have Amateur Radio printed on it plus maybe a picture of an antenna or something similar. Some of those expressed considerable interest in the plate as long as there was no additional cost, while others at the meeting felt that the license plate would be a flag to thieves that there was ham radio equipment in the vehicle. Those that favored the license plate pointed out that antennas for radios, cellular phones, etc are already a flag, so a plate would not make any difference. If you have thoughts on this, please pass them on to either Frank Butler, Evelyn, or me. My address is on page twelve. Don't forget the Tampa Hamfest/ARRL Southern Florida Section Convention that will be held on November 21-22 at the Tampa Fairgrounds. There will be RPTT, ARRL NTS/ARES and other forums held so hope to see many of you there. Bruce Reid, WB9SHT, ASM for Youth Activities, has published another issue of Hamlet—the official newsletter of FYARC and did a super job explaining how a FYARC (Florida Youth ARC) chapter can be formed. Bruce is coordinating youth activities for both sections in the state with an Advisory Council made up of members from both sections. The newsletter is sent to ARRL Affiliated Clubs, school clubs and other interested parties. He reports that four chapters of FYARC have already been formed. Neil Lauritsen, KA3DBK, EC Pinellas County, reported that Hillsborough County ARS members provided communication support to the Red Cross and Hillsborough County officials for a week after the extremely heavy rains of September 25th through 27. The rains flooded many areas of the county forcing the residents to be evacuated. After a week of providing that support, Pinellas County ARS members went to Hillsborough County to help and to relieve some of the Hillsborough hams that had been working all week. Great cooperation. Don't forget the ARRL Information Net every Saturday morning at 7:30 AM on 3940 kHz. 73 de AA4HT. Tfc: WA4VND 700, W3VR 685, W3CUL 588, KA2YZM 508, K4SCL 458, AB4XK 317, KA4FZI 253, KB4WBY 236, KC4ZFH 230, W7AMM 200, WB4PAM 155, KD4HGU 152, KD4GR 139, AA4HT 138, W4DL 133, KD4OGV 108, WA4EIC 104, KD4JMV 95, W4DWN 57, K2GN251, WD4JNM 43, AA4BN 40, K74XK 31, WB4GCK 26, KB4M0N 25, KE4WBI 20, K4RBR 17, W4WYR 17, KE4OUP 11, K4OVC 10, W3JR 9, K3KT 4, KD4QDD 2, WB4TOV 2.



**CH-32**  
Miracle Baby  
146/446MHz  
HT Antenna  
Length: 1.75"  
Conn: BNC

- Gold-Plated Connectors
- High-Quality  
Craftsmanship
- Unique Fold-Over  
Feature



**NEW Z750** • Dual-band 146/446MHz w/fold-over • Includes COMET exclusive theft-resistant lock!  
Wave: 146MHz 1/2 wave • 446MHz 5/8 wave x 2 • Length: 39" • Conn: Gold-plated PL-259 • Max Pwr: 200W

**NEW Z780** • Dual-band 146/446MHz w/fold-over • Includes COMET exclusive theft-resistant lock!  
146MHz 6/8 wave • 446MHz 5/8 wave x 3 • Length: 62" • Conn: Gold-plated PL-259 • Max Pwr: 150W

**NEW SBB-15** • Tri-band 52/146/446MHz w/fold-over  
Wave: 52MHz 1/4 wave • 146MHz 6/8 wave • 446MHz 5/8 wave x 3 • Length: 58" • Conn: PL-259 • Max Pwr: 120W

**NEW SBB-7/SBB-7NMO** • Dual-band 146/446MHz w/fold-over  
Wave: 146MHz 6/8 wave • 446MHz 5/8 wave x 3 • Length: 58" • Conn: SBB-7 PL-259/SBB-7NMO NMO • Max Pwr: 70W

**NEW SBB-5/SBB-5NMO** • Dual-band 146/446MHz w/fold-over  
Wave: 146MHz 1/2 wave • 446MHz 5/8 wave x 3 • Length: 39" • Conn: SBB-5 PL-259/SBB-5NMO NMO • Max Pwr: 120W

**CX-224/CX-224NMO** • Tri-band 146/220/446MHz w/fold-over  
Wave: 146MHz 1/2 wave • 220MHz 5/8 wave • 446MHz 5/8 wave x 2 • Length: 36" • Conn: CX-224 PL-259, CX-224NMO NMO • Max Pwr: 100W

**B-20/B-20NMO** • Dual-band 146/446MHz w/fold-over  
Wave: 146MHz 1/2 wave • 446MHz 5/8 wave x 2 • Length: 30" • Conn: B-20 PL-259/B-20NMO NMO • Max Pwr: 50W

**SH-55** • Super Flexible 146/446MHz HT Antenna  
Length: 15.5" • Conn: BNC • Max Pwr: 10W

**B-10/B-10NMO** • Dual-band 146/446MHz cellular  
look-a-like • Wave: 146MHz 1/4 wave • 446MHz 1/2 wave • Length: 12" • Conn: B-10 PL-259/B-10NMO NMO • Max Pwr: 50W

**COMET** Specializes in a wide assortment of Mobile Mounting Systems that require NO HOLES. A variety of trunk lid, hatch-back, rain gutter, roof rack and window mounts are available along with low loss coax cable assemblies, for the ultimate mobile station!

For a complete catalog of **COMET** Antenna products call or visit your local dealer. Or, contact NCG Company at 800/962-2611. Use **COMET** products, and enjoy amateur radio to its fullest!

# COMET

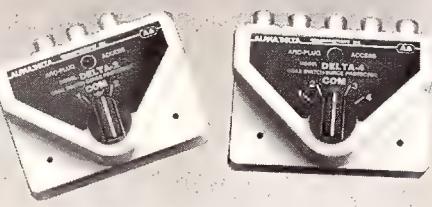
1275 N. Grove Street • Anaheim • California 92806  
(714) 630-4541 • (800) 962-2611 • Fax: (714) 630-7024

# Alpha Delta

## Model DELTA-2 and DELTA-4 Coax Switches

Setting "first in the industry" standards for lightning surge protection, precision low-loss switching and master antenna ground functions—all in a single, cost effective product.

- Arc Plug® cartridge surge protection system—replaceable element provides continuous protection of the active antenna circuit. Unused circuits are automatically grounded. Easy access through front panel.
- Master antenna ground function—internally disconnects and grounds all circuits when in center "off" position.
- Efficient low-loss cavity design—uses constant impedance micro-strip construction for outstanding low-loss performance and state-of-the-art co-channel isolation. No lossy wafer switches are used.
- All connectors are across rear for best "out of the way" cable installation. Other brands use front-mounted "common" connectors which cause unsightly cable loops.
- Positive detent roller bearing drive for "no question" switch positioning.
- The Delta Series handles full legal power.
- Cheaper switches typically don't have N-type connectors because poor, non constant impedance designs become obvious when using precision N connectors. One look inside cheaper switches will tell you they are still over priced.
- Designed and produced in the U.S.A. by Alpha Delta. See Data Sheet for surge limitations.



Model Delta-2 (2-position, UHF connectors, 500 MHz).....\$49.95  
 Model Delta-2/N (2-position, N connectors, 1.3GHz).....\$64.95  
 Model Delta-4 (4-position, UHF connectors, 500 MHz).....\$79.95  
 Model Delta-4/N (4-position, N connectors, 1.3 GHz).....\$89.95



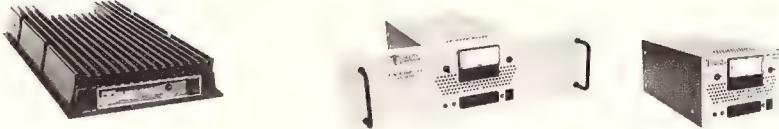
At your Alpha Delta Dealer or add \$5.00 for direct US. orders. Exports quoted.

### ALPHA DELTA COMMUNICATIONS, INC.

P.O. Box 620, Manchester, KY 40962 • (606) 598-2029  
 fax • (606) 598-4413

Radio—“The Original Information Superhighway”  
*—Alpha Delta Makes it Better.*

## TELETEC RF POWER AMPLIFIERS



Models shown have meter option installed

### DXP SERIES

MODEL #	FREQ.	PWR RATING (IN/OUT)	RETAIL PRICE	MODEL #	FREQ.	PWR RATING (IN/OUT)	RETAIL PRICE
				R=Rack			
				D=Desktop			
DXP-L180	6 meter	15W/180W	\$379.00	DXR-L180	6 meter	15W/180W	\$639.00
DXP-V175	2 meter	50W/175W	\$329.00	DXR-V175	2 meter	50W/175W	\$629.00
DXP-V220	220 MHz	20W/150W	\$369.00	DXR-V220	220 MHz	20W/150W	\$659.00
DXP-U150	70 cm	30W/150W	\$429.00	DXR-U150	70 cm	70W/150W	\$789.00

Teletec's DXP Series linear amplifiers clearly outperform the competition. The die cast aluminum heatsink provides an attractive low profile, but powerful package. These amplifiers operate in all modes: FM, SSB, CW, and AM. Transmit/Receive switching is automatic – RF sensed. Over/Reverse Voltage, Over-Temp, and VSWR protection are provided. Available options include: ATV tuning, Repeater tuning, Preamp disable and keying wire kit. "N" connectors are also available (std on DXP-U150).

Teletec's DXR Series linear amplifiers are 100% duty cycle packages. Super quiet dual fans are used to keep the heatsink and internal components extremely cool. DXR series amplifiers provide the same operational features as the DXP series. "N" connectors standard on all DXR models.

Teletec's DX Series GaAs FET Preamps are also available for \$74 plus S&H.

### VISA/MASTERCARD ACCEPTED, 18 MONTH LIMITED WARRANTY

Prices and specifications subject to change without notice.



TELETEC  
CORPORATION

For more information, call or write:  
 10101 Capital Blvd, Wake Forest, NC 27587 – USA  
 Order Line: Toll Free (888) 323-6888  
 Technical: (919) 556-7800 Fax: (919) 556-6180  
 E-mail Address: [TELETEC@SPRINTMAIL.COM](mailto:TELETEC@SPRINTMAIL.COM)

**VIRGIN ISLANDS:** SM, John Ellis, NP2B, St Croix—ASM: Drew, NP2E, St Thomas—ASM: Mal, NP2L, St John. SEC: Vic, WP2P. PIC: Lou, KV4JC. ACC: Debbie, NP2DJ. NM: Bob, VP2VI/WDXD. St John ARC is now meeting on the first Saturday of each month, at 9:00 AM, no regular site yet, but contact someone on the local repeater for info. St John repeater has now moved from 146.97 to 146.63 to get away from other repeater QRM. St Thomas ARC is now meeting at "Hook, Line & Sinker" in Frenchtown, not far from old Seaplane base. Time is noon, every Tuesday. For further info, contact someone on 146.81 repeater. NP2E and KP2N worked the RTTY contest, looks like they made over a million points. Good work folks! Looks like the island-wide St Croix ham radio and local club awareness party will be scheduled for November since a suitable site was not available in October. There will be a silent auction of the ham gear owned by Clyde Singleton (SK), KP2M, whose family graciously donated the equipment to the club. No storms this year, antennas going back up for the contests! 73, John, NP2B.

### SOUTHWESTERN DIVISION

**ARIZONA:** SM, Clifford E. Hauser, KD6XH—This year is almost gone, and I have not completed what I started out the accomplish, visiting all the clubs in Northern Arizona. My present plan is to be in Yuma on December 3rd for their meeting and also at the fall hamfest in Mesa on December 6, 1997. By the way, are you planning to attend the Superstition hamfest at Mesa Community College on December 6, 1997? This event will be larger than last year with many people selling and a lot of people buying. The Quarter Century Wireless Association (QCWA) dinner will be held at the Scottsdale Safari hotel at 1200 hours on Saturday December 6, 1997. The Eastern Valley Amateur Radio Group (EVARG) will commemorate the battleship, USS Arizona, lost at Pearl Harbor on December 7, 1941, with a special event station. Frequencies to be used are 14.240 MHz, 21.340 MHz, and local 2-meters. QSL via EVARG, 3264 E. Carol Ave., Mesa, AZ, 85204-3245. The Arizona Science Center ham station is over 6 months old. Have you visited the center to see what the local Amateur Radio population has accomplished? If not, do it soon, you can even operate their station. The Arizona traffic system is alive and well with Robert Howe, W7EP, as the state traffic manager. Each night at 0700 hours on 3992 MHz is the Arizona traffic net. Check in and help our state maintain a good traffic flow. Oliver Grieve, W7WGW, has an excellent 2-meter repeater, 146.860 (-), located in Benson that gives good coverage for southern Arizona. Also there is an EAAR net every Sunday evening at 1900 hours on 146.900 (-). This repeater is located on Heliograph Peak. The three (3) DX clubs are very active and doing well. Did you read your October QST about the FCC change to the Amateur Radio station RF exposure evaluation? They did a sliding scale on power output that most likely means that your station will be exempt from testing (if not using linear) for all frequencies except 10 meters. Len Winkler, KB7LPW, "Ham Radio and More" is alive and well. Ned Stearns (Mr. Professor), AA7A, is the co-host. For the Phoenix area, the time is 1400 hrs local (2200 Z) on Sunday on KFNN, 1500 AM, and on 12.160 MHz (short wave). 73, Clifford E. Hauser KD6XH. Net: ATEN 638 QNI, 66 QTC, 30 sess. Tfc: K7VVC 669, AB7NK167, WB6OTS 98, W7EP 97, KJ7KL 36.

**LOS ANGELES:** SM, Phineas J. Icenbice, Jr., W6BF—Every word that you use is an indication of your wisdom or ignorance. Your greatest gift is your thinking mind. Don't set up rules of conduct for others until you have a workable system for yourself. Pull gets you an introduction, but to continue you must do most of the pulling yourself. Oh, well, there must be a million good "quotes" like these, but these are a few of the selected "quotes" from *Think and Grow Rich*. We had a great ARRL Convention at Riverside this year. Parking was free, and everything was clean and neat. This always puts the convention attendee in great mood. Congratulations to AD0A, Jerry, and all of the great gang who contributed their time and talent. It was really great. Our own, "Mr. Lightning himself," Bill Wysock, N6UXW, put on his unusual and outstanding "very high voltage demonstrations" with one of his many Tesla Coils. Don't miss the next "Big ARRL Convention" in this division. In 1998, it will be in San Diego. The PANDA Convention—yes, it also called Pandemonium! Several hundred preregistrants already have their PANDA pins. Traffic totals: Hank, W6SX, 29 (on vacation), and Jerry, AD0A, 88. Attention ARES operators: Every Sunday (160 meters) at 11 AM on 1945 kHz, you can join in the fun and practice for emergency work. When the real emergency arrives this may be one of the best bands for local traffic. When you operate this top band for local contacts remember the low, near-horizontal antenna is often 10 to 20 dB better for short-range contacts. -3.3 million FCC records are available on CDROMS (all FCC licenses & frequencies) for about \$38, from Per Con Corp. (716-386-6015) Limited free information is also available on the internet. (<http://www.perconcorp.com>). I was able to pull up 13 pages of LA County frequencies, call signs and other valuable information. ARES information is available from our SEC, Hank Magid, K6YMJ, ([hmagid@aol.com](mailto:hmagid@aol.com)) or his assistant SEC, Dennis, KAGGSE, ([dsmith@smartdocs.com](mailto:dsmith@smartdocs.com)) Noisy volume controls and erratic mice (computer mouse) are easily fixed with the famous WD-40, it doesn't take much. In most cases, but not all, repair is possible by spraying the WD-40 into the erratic area without removing any covers or knobs. My experience has been 100% so far (10 out of 10). Good Luck and God Bless! 73 de W6BF, Phineas.

**ORANGE:** SM, Joe H. Brown, W6UBQ—From our SM, Joe Brown, W6UBQ: "What Jerry, AD0A, Jeff, KD6NXD, and all the SW Div Convention Committee chairs promised, they delivered. Congratulations." Joe also advises that Art Suturos, KQ6HF, is taking over from John Wendt, WA6BFH, as the new Orange Section Technical Coordinator, and that Joe Magaditsch, KO6XB, is taking over as Riverside County Asst Sec Mgr from long-time volunteer, Bob Mann, W6LKN, who recently retired due to illness in the family. Congrats, Art and Joe, and may you both serve for many years with pride and distinction! In an e-mail to SW Dir Fried Heyn, WA6WZO, Bill Pasternak, WA6ITF, of "Newsline" made an extraordinary statement regarding last Sept's SW Div Convention. "Riverside was probably the BEST convention ever in the SW Division. Please pass along my congratulations

## EXTEND-A-MAST

New Concept telescoping antenna mast

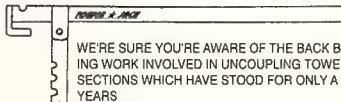
- **Non-conductive** mast improves antenna efficiency
- **One person** can erect 50' mast in about one hour
- Kits or complete mast system

Call or write for more information:

Olam Machinery, Inc.  
P.O. Box 328  
Pierron, IL 62273

ph: 618-654-2309 fax: 618-654-4872

### HAVING PROBLEMS TAKING TOWERS DOWN??



WE'RE SURE YOU'RE AWARE OF THE BACK BREAKING WORK INVOLVED IN UNCOUPLING TOWER SECTIONS WHICH HAVE STOOD FOR ONLY A FEW YEARS

PEOPLE FIGHTING THESE KINDS OF BATTLES HAVE USED EVERYTHING FROM 2X4'S TO SCISSOR JACKS WITH A CERTAIN DEGREE OF SUCCESS AND TOO MUCH WORK, LET ALONE THE ELEVATION ABOVE GROUND WHICH IS TO BE TAKEN INTO CONSIDERATION.

NOW COMES "TOWER JACK," THE GREATEST LITTLE FRIEND YOU'LL EVER NEED WITH YOU ON A TOWER. WHETHER IT BE 15 OR 150 FT. UP, YOU'LL FIND DISMANTLING TOWER SECTIONS A SNAP WITH "TOWER JACK." WILL DISASSEMBLE AND ASSEMBLE ALL ROTH MODELS 20, 25, 45 and 55. Retail \$59.50 • Ham Net \$44.50

Plus \$5.50 S&H

Send \$50.00 Check or M.O. to  
"TOWER JACK," PATENT PENDING

P.O. BOX 82321, BATON ROUGE, LA 70884-2321  
FOR INFORMATION - CALL (504) 924-7708

ASK ABOUT OUR OTHER PRODUCTS. DEALERS INVITED.

**TOWER JACK™**

## 3-500Z GRAPHITE

- ✓ Heavy Duty Graphite Anode
- ✓ Best Prices
- ✓ In Stock
- ✓ Full Factory Limited Warranty
- ✓ "Drop In" replacement for 3-500Z metal plate tubes

3-500ZG RF Parts brand \$119.95

Matched Pair \$249.90

3-500ZG Eimac \$229.95

3-500Z/8802 Amperex Reg. \$199.95 \$159.95

### Popular Svetlana Tubes

572B List \$88 \$59.95

572B Matched Pair \$129.90

572B Matched Set/4 \$259.80

811A Commercial Black Base \$15.95

811A Ceramic Base List \$25 \$19.95

811A Matched Pair \$39.90

811A Matched Set/3 \$59.85

811A Matched Set/4 \$79.80

RF Parts gives a second year Extended Limited Warranty Svetlana 572B & 811A (cer. base), and RFP brand 3-500ZG tubes.

RF Parts stocks most Eimac & Svetlana Transmitting Tubes up to 20,000 Watts Dissipation.

Tel: 800-737-2787 • 760-744-0700

Fax: 760-744-1943 • 888-744-1943

E-mail: rfp@rfparts.com



**RF PARTS**

435 SOUTH PACIFIC STREET  
SAN MARCOS, CA 92069

# TIMEWAVE DSP-59Y

## Buy the World's Finest DSP Filter and Get a \$25 Rebate!



*The DSP-59Y is the ultimate in DSP technology and fully inserts into the Yaesu SP-5 and SP-6 speaker cabinets, reducing cabling and giving your station a totally integrated appearance.*

Timewave's DSP-59Y outperforms all stand-alone filters and DSP radios. It has the fastest processing power and easiest to use DSP filtering for all modes of operation. The DSP-59Y provides the best effective upgrade to any transceiver or receiver made today and brings old gear up to new specifications. An easy to read LCD screen gives you all information needed to monitor and adjust your filter.

Check the Timewave web site for amateurs using Timewave filters and listed reviews from magazines worldwide at <http://www.timewave.com>

Timewave DSP-59Y is reviewed in September 1997 QST Magazine.

Special \$25 dollar rebate from September 1997 to December 31, 1997. Send in a copy of your receipt. Allow 4 weeks for processing time. Limited to individual amateurs and shortwave listeners.

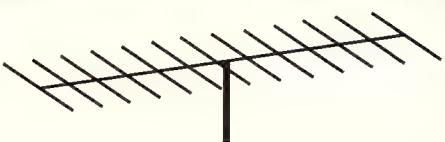
**TIMEWAVE**  
TECHNOLOGY INC.

2401 Pilot Knob Road St. Paul, MN 55120 USA

Phone: 612-452-5939 Fax: 612-452-4571

email - [sales@timewave.com](mailto:sales@timewave.com) World Wide Web - <http://www.timewave.com>

# C3I Antennas do it again!



**For the second straight time, a C7-50 has taken top honors in a major VHF contest. In both the 1997 ARRL June and September VHF QSO parties, K8GP, using a C7-50 has had the highest 50 MHz score of any other station. In addition, using a pair of FO16-222's and a pair of FO22-432's, K8GP also had the top scores on 222 MHz and 432 MHz in the September QSO party.**

## Start hearing the weak ones!

For the finest antennas call or write today for a free catalog. Or visit us on the web at [www.c3iusa.com](http://www.c3iusa.com). We currently have antennas available for 50 MHz through 432 MHz from 5 elements to 33 elements. Antennas for 903 MHz, 1296 MHz, and satellites are being developed, along with a monster 13 element 50 MHz yagi for the coming F2 openings! We carry antennas maximized for SSB/CW/EME, ATV, and FM

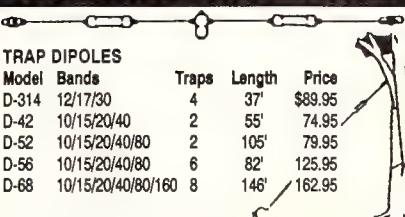
## C3I Antennas

  2702 Rodgers Terrace   
Haymarket, VA 20169

**1-800-445-7747**

Fax (703)753-2799  
or on the web at [www.c3iusa.com](http://www.c3iusa.com)

## ALL BAND ANTENNAS



### TRAP DIPOLES

Model	Bands	Traps	Length	Price
D-314	12/17/30	4	37'	\$89.95
D-42	10/15/20/40	2	55'	74.95
D-52	10/15/20/40/80	2	105'	79.95
D-56	10/15/20/40/80	6	82'	125.95
D-68	10/15/20/40/80/160	8	146'	162.95

### TRAP VERTICALS—"SLOPERS":\*

VS-312	12/17/30	2	19'	\$62.95
VS-32	10/15/20	2	13'	59.95
VS-42	10/15/20/40	2	24'	64.95
VS-53	10/15/20/40/80	3	42'	79.95
VS-64	10/15/20/40/80/160	4	73'	98.95

\* Can be used without radials

\* End Fed

\* Feedline can be buried if desired \* Permanent or Portable Use

ALL TRAP ANTENNAS are Ready to Use - Coax Fed - Factory Assembled - Commercial Quality - Handles 600 Watts - Comes complete with: Deluxe Traps, Deluxe Center Connector, 14 ga. Stranded Antenna Wire and End Insulators. Automatic Band Switching - Tuner usually never required - For All Transmitters, Receivers, & Transceivers - For All Class Amateurs - One Feedline works All Bands - Instructions included.

### SINGLE BAND DIPOLES

Model	Band	Length	Kit Form Price	Assembled Price
D-10	10	16'	\$18.95	\$23.95
D-15	15	22'	18.95	23.95
D-20	20	33'	19.95	24.95
D-40	40	66'	24.95	28.95
D-80	80/75	130"	29.95	33.95
D-160	160	260'	41.95	45.95

Includes Instructions, Deluxe Center Connector, 14 ga. Stranded Antenna Wire and End Insulators. Coax Fed.

### LIMITED SPACE DIPOLES



- Reduces overall length over 40%!
- Coax Fed.
- Shorteners are enclosed, sealed, weatherproof and lightweight.
- Complete with Deluxe Center Connector, 14 ga. Stranded Antenna Wire, End Insulators, and Assembly Instructions.
- Use as inverted "V", or flat-top.
- Excellent for all class amateurs.

Model	Band	Length	Price
LS-40K	40	38'	\$48.95
LS-80K	80/75	69'	54.95
LS-160K	160	100'	56.95

- Any single band, or Trap antenna with PB-1 Balun instead of Deluxe Center Connector; Add \$10.00 to antenna price. (For PB-1-C - Add \$12.00)

### COAX CABLE: (includes PL-259 connector on each end)

Type	Length	With Antenna Purchase	Separately
RG-58	50'	\$12.00	\$13.95
RG-58	90'	17.00	19.95
RG-8/213	50'	27.95	31.95
RG-8/213	100'	44.95	48.95
RG-8X	50'	14.95	18.95
RG-8X	100'	22.95	26.95

### ALL BAND - LIMITED SPACE ANTENNA



- Works ALL Bands 160 thru 10 Meters
- Sealed, weatherproof lightweight shorteners utilize NO rust terminals
- Perfect match for your Antenna Tuner
- Handles Full Power
- Works with all transmitters, transceivers, receivers, etc.
- Completely Factory Assembled - Ready to install - NO adjustments necessary
- INCLUDES 100ft. of 450Ω Feedline

MODEL AS-2 - \$49.95

SEE YOUR DEALER, OR ORDER DIRECT FROM FACTORY.

SHIPPING: Add \$4.00 within U.S.; CANADA: Add 10% (min. \$5.00)

 VISA / MC - give card no., exp. date & signature 

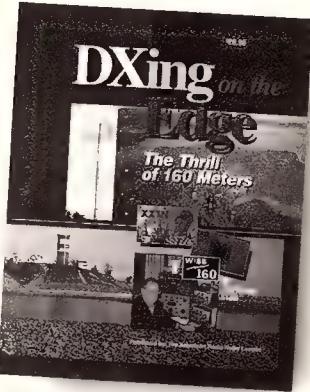
**ORDERS ONLY - 1-800-728-7594**

FREE BROCHURE & INFORMATION - 704-693-1001

FAX - 704-693-3002

**SPI-RO MFG., INC** P.O. Box 2800  
Dept. 106 Hendersonville, NC 28793

## Are you a Topband Operator?



You will be with help from—  
**DXing on the Edge—The Thrill of 160 Meters**

Seasoned operators refer to 160 meters as *Topband*. It used to be the Mt. Everest of the Amateur Radio bands. But with the help of this book, you'll have an insider's look at what it takes to reach the summit! **DXing on the Edge** chronicles the history of *Topband*, from the start of 160 meter operating in the early 1930s until today.

### The W1BB Story

Much of 160 meter history revolves around the late Stew Perry, W1BB. His QSL card remains prize wallpaper for amateurs around the world.

### Audio CD inside!

This book includes an audio CD of some truly exotic and exciting QSOs made from prominent DX stations.

Use **DXing on the Edge** to navigate the 160 meter band. It's filled with useful operating tips for non-technical and technical operators. Order your copy, today!

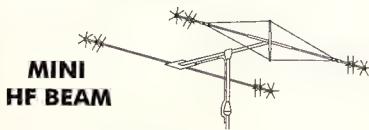
**ARRL Order No. 6354 — \$29.95, plus \$5 shipping (UPS).**

**American Radio Relay League**  
phone: 888-277-5289 (toll-free)

fax: 860-594-0303

225 Main Street  
Newington, CT 06111  
e-mail: [pubsales@arrl.org](mailto:pubsales@arrl.org)  
<http://www.arrl.org/>

## HYBRID-QUAD ANTENNA



Most Antennas are large, heavy structures requiring heavy-duty towers, rotors and require extra muscle during installation and lots of extra dollars before the job is done.

The Hybrid-Quad is sensibly designed, built from high-quality materials and mounts with standard TV hardware and rotor. It's small size gathers very little ice and wind which allows you to spend more time ON the air, rather than IN the air.

Try this Hybrid-Quad. You'll be amazed.

**MQ-1 Four-Band Antenna.....\$229.95**

6,10,15,20 Meters

Element Length...11 Ft.  
Boom Length.....4.5 Ft.  
Turning Radius...6 Ft. 2 in.

Wind Loading.....1.5 Sq. Ft.  
Weight.....15 lbs.  
Power Rating.....1200 Watts P.E.P.  
Input Impedance-Single 50 ohm

**MQ-2 Six-Band Antenna.....\$298.95**

6,10,12,15,17,20 Meters

Shipping charges extra.



**T.G.M. Communications**

121 Devon St. Stratford,  
ON Canada N5A 2Z8  
Tel. & Fax (519) 271-5928

## ARRL Publications



If it's Ham Radio or Electronics, you'll find it in a **LEAGUE** Publication!

CD-ROMs, Videos, Books, and More!

To find an authorized ARRL dealer today, call toll-free 1-888-277-5289.

## From MILLIWATTS to KILOWATTS

*Does your Transmitter need  
Transistor Finals or a  
VHF/UHF Power Module?*

RF Parts stocks a full line of original part numbers at a substantial discount from the equipment manufacturer's price.

### AMATEUR – MARINE – TWO WAY

We have them all!

✓ ICOM ✓ KENWOOD ✓ ALINCO  
✓ YAESU ✓ ATLAS ✓ STANDARD  
✓ RADIO SHACK ✓ HEATHKIT ✓ SWAN

• Immediate shipment from stock  
• Matched sets of 2, 4, 8, 16, etc. available.  
• Bi-polar and Power MOS in stock.

Technical Questions? Applications Engineering help available from our Customer Service Department at:

(760) 744-0750.

e-mail: rfp@rfparts.com

**ORDERS 1-800-737-2787**      **ORDERS**  
1-760-744-0700

**FAX 760-744-1943**      **FAX**  
888-744-1943

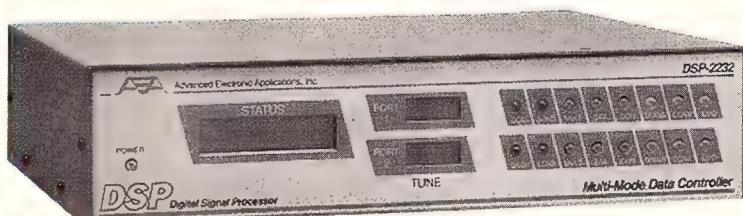


**RF PARTS**

135 SOUTH PACIFIC STREET  
SAN MARCOS, CA 92069

## TIMEWAVE BUYS AEA DATA!

Now The Leader in DSP and Data



### DSP-2232 with a New Low Price!!!

The DSP-2232 is the only cost-effective dual port multi-mode data controller with the advantage of DSP front-end filtering. Work HF DX on RTTY and monitor the DX Packet Cluster on VHF or UHF at the same time. PC PakRatt for Windows 2.0 software included! The DSP-2232 has over 30 proven modems for HF and VHF/UHF. The LCD display shows connection status and callsigns on packet. On RTTY, AMTOR, and PACTOR, even received text is displayed. For satellite work, the DSP-2232 is the amateur radio standard.



### DSP-599zx - QST says "A superb station accessory!"

The **DSP-599zx** combines a hyperspeed DSP processor with an alphanumeric display, quick-select pushbuttons and optical encoders to wipe out noise and QRM. Heterodynes disappear like magic, weak signals pop up from the noise, and the razor-sharp filters slice away the QRM. Continuous filter tuning to 5 kHz opens up wider bandwidth modes like shortwave AM broadcast, VHF/UHF FM and sophisticated data modes. It's easy to read, set, and recall all of the DSP-599zx settings with the backlit alphanumeric display - no guessing with Timewave Calibrated Filters™ and Visible Memory™.

- Enhances voice, data and CW
- Kills heterodynes automatically
- Calibrated Filters™ slice QRM
- Reduces noise automatically
- Visible Memories™ with LCD display for instant recall
- Field upgradeable
- Two selectable inputs
- Hyperspeed DSP - 36.8 MIPS
- Wideband for AM and FM
- AM line noise filter

### NEW LOWER PRICES!

**PK-12 TNC \$99**

**PK-96 TNC \$169**

**DSP-2232 \$499**

(Manufacturer's suggested retail prices)

**Call your dealer to order now!**

### Timewave Acquires AEA Data Products!

Visit <http://www.timewave.com> for the latest information on Timewave and its DSP filter and **AEA Data** products. You'll find upgrade information, tech tips, data sheets, operating manuals, dealer info and more!

**TIMEWAVE**  
TECHNOLOGY INC.

2401 Pilot Knob Road St. Paul, MN 55120 USA

Phone: 612-452-5939 Fax: 612-452-4571

email - sales@timewave.com World Wide Web - <http://www.timewave.com>

# ALL ELECTRONICS

C O R P O R A T I O N

## 3 Volt Lithium Coin Cell with PC Leads

Panasonic # BR2330-1GU

3 volt, 255 mAh coin cell. 0.9" diameter x 0.12" thick. 0.7" between positive and negative pc leads.



VERY SPECIAL PRICE  
LARGE QUANTITY AVAILABLE

**75¢** each

20 for \$12.00  
100 for \$45.00  
CAT #LBAT-16

1000 for \$300.00

## ELECTRET MIKE

Panasonic # WM 54BT-D

Electret condenser microphone cartridge. Low impedance, omnidirectional mike. 20 - 12,000 Hz. 0.38" dia. x 0.175" high.



CAT #MIKE-36

**60¢** each

10 for \$5.50  
100 for \$45.00

## Ultrabright LED

### PAINFULLY BRIGHT RED LED

2500 to 4000 mcd @ 20 ma. T 1 3/4 (5 mm diameter) red LED. Significantly brighter than conventional LEDs. Water clear in off-state.

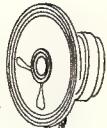
CAT # LED-42 **2 for \$1.20**

10 for \$5.00 • 100 for \$45.00  
1000 for \$400.00

## 2 1/2" 8 Ohm Speaker

Panasonic # EAS65P76A3

8 ohm 0.4 watt speaker with soft-edge paper cone for good frequency response. 0.93" overall depth. 2.25" wire leads with 2 contact (0.1" spacing) socket connector. Large quantity available.



CAT # SK-255

**\$1.00**  
each

10 for \$8.50  
100 for \$70.00

### ORDER TOLL FREE

# 1-800-826-5432

CHARGE ORDERS to Visa, Mastercard,  
American Express or Discover

TERMS: NO MINIMUM ORDER. Shipping and handling for the 48 continental U.S.A. \$5.00 per order. All others including AK, HI, PR or Canada must pay full shipping. All orders delivered in CALIFORNIA must include local state sales tax. Quantities Limited. NO COD. Prices subject to change without notice.

CALL, WRITE  
FAX or E-MAIL  
for our FREE

96 Page  
CATALOG  
Outside the U.S.A.  
send \$3.00 postage.

MAIL ORDERS TO:  
ALL ELECTRONICS

CORPORATION

P.O. Box 567

Van Nuys, CA 91408

FAX (818)781-2653

e-mail [allcorp@allcorp.com](mailto:allcorp@allcorp.com)  
internet - <http://www.allcorp.com/>

to those who made it happen." Thanks a million, Bill, from all those who worked so hard to make it go. Fred Roberts, W6TKV, wrote a great blurb about the special-event station at the HAMCON '97, and we'd love to publish the whole thing in this column; however, it isn't possible. Highlights include: "...This was the very first time W1AW has been authorized for use at any division-level convention. In addition to the special-event team consisting of members of the Corona Nórð ARC, the Riverside County ARA, and the Golden Triangle ARC, there were many guest operators who were attending the convention. A total of 47 hams operated W1AW/6 contacting 47 states and 6 countries with a total of 779 QSOs. Everyone associated with this station had a great time." The IECARO trophy for most points garnered on Field Day was awarded to the Citrus Belt ARC (C-Bar-C). Fullerton RC's pres, John, KD6PGC, comments on the radio frequency auctions approved by Congress: "...the rush to grab radio spectrum makes the Oklahoma land rush of 1899 look like a slow waltz. In any event, you can be sure that our current band allocations are not all that secure. Chief RACES Officer for the City of Huntington Beach, Ron Jagodinski, KD6EMN, reminds amateurs here in So Cal: "Let's all be prepared for El Nino this year." The coastal cities will surely be hit with storms from the south, with resultant high surf and flooding. Some estimates project the Inland Empire may see 40 or more inches of rainfall this year. STM N6GIW reports for September 1997: NTS Tfc - KO6RZ 305, N6GIW 217, KC6SKK 125, KD6EYI 64, W6QZ 58, KA6TND 17, N3IVO 13, W6QZ NTS BBS 270, SCVN/30 sess; QNI 342; QTC 138. PSHR: W6QZ 127, KO6RZ 127, KC6SKK 102, N6GIW 93. Glenn also writes: "CW traffic handlers please try SCN/I on 3598 KHz at 7:30 PM weekdays." Vy 73, KE6JOF.

**SAN DIEGO:** SM, Patrick Bunsold, WA6MHZ, 619-561-0052—SEC: Pat Ryan, WA6VVT. ASM/MARS: Harry Hodges, WA6YOO. ASM/ACC/PIC: Tuck Miller, KC6ZEC. ASM for Youth: Frank Forrester, K16YG. ASM for Red Cross: Al Rich, W6WYN. Bld Mgr: Steve Adams, K6PD. STM: Warren Tjelle, KT6A. SGL: Bob Spann, K6EJB. OOC/TC: Del Radant, N6JZE. DECs: North: Dennis, K7DCG, South: Pat, KA6PSG. East: Rich N6KJN, Central: Dave, KC6YSO. Hurricane Nora, while not a deadly one, still did lash the section, especially Imperial County and area hams were on the scene helping out. ARES & RACES were busy. A tragic wildfire was ravaging Escondido at the same time, which the rain eventually put out but not before several homes were lost. Palomar ARC had a giant auction where the most exciting item was a new-in-the-box WW2 ARC-5 xtrmr (which I was outbid on). Big turnout at the PARC picnic at Dixon Lake. ARC of El Cajon had Gordon West, WB6NOA's, spectacular program. SOBARS guested Charles, WS6F, on the Wonderful World of DX. Fried and Sandi, WA6WZO/WA6WZN, came to the El Cajon Elks ARC. Tremendous turnout for the Sandra Pizza Party at Fillipi. Remember the gigantic HAM/COMPUTER SWAPMEET 1st/3rd Sats at Santee Drive-in. ARES Sunday Nets: 3905 @ 9 AM, 146.265 @ 7 PM. Traffic: SDCTN: Sess 29, QNI 377, QTC 188. ARESN: Sess 4, QNI 15, QTC 2. Tfc: KT6A 509, KO6JYB 309, KO6BU 46, KE6IQQ 46, WB6IIK 2. PSHR: KT6A 134, KO6JYB 101. SDCTY Traffic Net 8 pm every night on 146.730 (-) Internet e-mail: [wa6mhz@juno.com](mailto:wa6mhz@juno.com). Packet ADR: WA6MHZ@WB6DGR. # SOCA.CA.USA.NA. PBBS: WA6MHZ-10 (via UWUNOD) on 145.630. APRS: 145.790.

**SANTA BARBARA:** SM & STM, Rob Griffin, K6YR, 805-543-3346 & [k6yr@arrl.org](mailto:k6yr@arrl.org)—SEC: Jennifer Roe, AA6MX. ACC: Chuck McDonald, K4CAN. BM: Howard Coleman, W6HQA. OOC: Tom Perkins, KD6BX. PIC: Jeff Reinhardt, AA6JR. TC: Warren Glenn, KM6RZ. ASMs: Doc Gmelin, W6ZRJ & Don Milbury, W6YNN. DECs: SB-Rick Laird, KB5OO, SLO-Jack Hunter, KD6HNG, & Ven-Dave Gilmore, AA6VH. The '97 SLO Co Siren Test a success thanks to area hams and Bob, WA7NMJ. Several SB section hams were spotted at the very successful '97 SW Div Convention in Riverside. Make plans to sign up for the '98 Convention in San Diego. Contact me for more info. FEMA is offering preparedness info on the coming El Nino: call 800-323-5248. The San Luis Obispo Co Emergency Communications Council has published an excellent brochure explaining SLOECC services and resources, thanks to Bob, W6TTX, the SLOECC newsletter editor. The ARRL Board of Directors has authorized filing of a petition to the FCC to include band-planning in Part 97, the Federal Regulations for the Amateur Radio Service. Please contact your Div Dir, Fried, WA6WZO, on this important issue. Volunteer band-planning needs to have some teeth, and this approach may be the way to do it. The VCARC has set December 12, at 5 PM for the DecemberFest Annual Dinner in Ventura. Contact Ralph, KE6KSX, at 482-5919, for details. Martin Reid, N6QU, is offering a series of fine, short articles on CW ideal for newsletters. Club editors contact me for details on obtaining this series free. Tfc/PSHR: K6YR 311/193, KE6MIW 21/103, W6ZRJ 44/-, KM6RZ 8/-, WA6DQK 2/93, & KE6GFV 4/96.

## WEST GULF DIVISION

**NORTH TEXAS:** SM, Bob Adler, N5NY—Pkt N5NY@N5NY.DFW.TX, e-mail: [n5ny@arrl.org](mailto:n5ny@arrl.org). ASMs: K5ATTO, W5GPO, W5IWE, KG5SBC, WDSVIL, K5BLES, WB7NPB, W5NPFI, N5UQA, K5B5YM, N5WOY, K5JAE, K5RE, K5LP, K5SXK, K5ZSB, K5NA, K5QKA, K5GE, K5CEWI, K5UG, K5CAYL, K5B5JB, W5FB, K5XK. ACC: K4TTT. STM: K5C0ZT. SEC: K5UPN. PIC: W5WL. SGL: N5GAR. TC: K5JBA. OOC: WB5UDA. BM: W5OH. Greetings All! First things first, my apologies to Gary Hall, K5BLWZ, the Emergency Coordinator for Hunt County. I did the "unthinkable" in my column last month and misquoted Gary's call sign, please forgive me for the oversight, Gary. And in Hunt County, we have several dedicated hams that are currently working under Gary's direction and with the Greenville City Council on a zoning ordinance that could potentially prohibit the addition of towers in Greenville. By the time this article is published, will have either failed or succeeded, but the actions of those who have dedicated their time and efforts in this mission will certainly be appreciated. John McFadden, N5TIP, recently was elected as president of the Rockwell Amateur Radio Club. I think that John was up for a couple of years and did such a fine job in that capacity, that he was asked to serve as president. I am certain that you will do a fine job John; congratulations. In

North Texas, we are currently looking for hams who are members of the ARRL and that may have an interest in one of the following field appointments: Official Relay Station—Official Relay Stations send, receive, originate and deliver formal messages on behalf of the public, and report their activity to their Section Manager and Section Traffic Manager. Official Emergency Station. The Official Emergency Station is ready, willing and able to answer the call when normal communications are down. Are you? If so, talk OES with your Section Emergency Coordinator. Official Bulletin Station: The "town crier" of Amateur Radio, the OES transmits official and local bulletins of interest to radio amateurs via local and section nets, on the air bulletin board systems, and other information outlets. Getting the word to the troops is one of the most crucial jobs in today's Field Organization. Public Information Officer: Have you got an "in" with the local news media? Or, do you have a shack that is photogenic, lending itself well to TV crews doing live interviews when Amateur Radio makes the 6 o'clock news. The active PIO makes sure Amateur Radio is seen in a positive light by the public. Technical Specialist: "How do I feed my dipole?" "What size feed-line should I use?" The TS is the point man for questions like these from Novices and old-timers alike. The TS also steps in to assist with local RFI problems. The above is just a partial listing of the field appointments and the qualifications for all of the above is full ARRL membership, Novice or higher license. In addition to the requirements, the Official Emergency Station appointment requires that you have emergency power. These are just a couple of the rewarding appointments that you may apply for and we encourage you to consider doing so. The reward is a sense of satisfaction that is unequalled. Due to a lack of "news-worthy" information, that's about it for this month. If you or your club has anything that you would like mentioned, send it to me at the Callbook address or [k5at5t@swbell.net](mailto:k5at5t@swbell.net). Until next month, 73 and may God Bless, Bob, K5ATTO.

**OKLAHOMA:** SM, Coy Day, N5OK—ASMs: N6CL, K5CPZ, KB5ZUD. SEC: W5ZTN. STM: AB5RV. ACC: KB5BOB. PIC: WA9WUQ. OOC: K5WG. SGL: W5N5ZS. (<http://www.telepath.com/n5ok/>) The Great Plains Amateur Radio Club sponsored a great Swapfest in Shattuck. The wind mills in the center of town are a must see! Dave, K5DFX, invited me to Ponca City to be the speaker for the first fall meeting of the Kay County Amateur Radio Club. I found a good number of excited radio amateurs with a fairly even spread from new hams to old-timers. They are very active with a couple of repeaters, VE sessions, a weekly net, a bimonthly newsletter, storm spotters, etc. We wish Nate, KA0RN, well with his new QTH in Kansas. He has his antennas back up so watch for him. John, K5C6VEI, reports the Univ of Oklahoma ARC participated in the Sept VHF QSO Party, running 4 bands from the top of Sarkey's Energy Center in Norman, about 150 ft up. Highlights were a 70 cm FM contact into Ft Worth, and 2 M and 6 M contacts into South Dakota. Tulsa Amateur Radio Club supported the MS150 this year with a portable 2 meter repeater on 147.045. They furnished mobile comm for emergency and medical vehicles. The operation was from a command trailer they had converted from a Salvation Army canteen trailer. John, KB5VR, reports that he, PETE, K5FRD, Don, AC5IL, Jeff, K5RTH, Harlan, K9GDK, and William, K5SFB, helped, Don, W5UUS, demo Amateur Radio to about 4,000 Boy Scouts at Camp Russell. They made many contacts with two HF rigs and used hand-helds for local work. Tfc: N5IKN 602, W5BSNK 407, K5GBN 221, KE5JE 174, WA5OOU 83, WB5NQD 72, AB5J 48, AB5V 46, K15V 36, W5REC 31, K15LQ 27, K5CPDX 18.

**SOUTH TEXAS:** SM, Ray Taylor, N5NAV—As the new Section Manager for South Texas, I would like to take this opportunity to thank Alan Cross, WA5UZB, for his contribution to the ARRL and the South Texas Section. If I can be of any assistance to you in your future Amateur Radio endeavors, please let me know. I want to thank all of you who had confidence enough in me to be the South Texas Section Manager. I hope I can meet your expectations. The Section Manager can't do much without the support from the field. I will be looking forward to working with you. Double thanks to Ed Larose (KS5V) and Don Jones (N5WSW). Just a brief introduction. As some of you know, my greatest interest is in traffic handling and emergency communications. I am very technically oriented, and still enjoy the building and repair of equipment and antennas. I conduct training on 2 meters and HF on traffic handling, NTS system, NCS and EC responsibilities, reports, and emergency communications procedures. There are so many areas in ham radio in which people may participate. By the time you read this, most of you will have completed this year's SET exercise. I hope this was a real learning experience for each group, and you spotted your areas for improvement. I hope in the coming years to see more SAR and PSHR reports coming in from the section. We might have to have two pages in QST to handle it all. If there is any way I can assist anyone please let me know. If there is anything you would like in the section news, let me know. The best of hamming and 73 to all. Tfc: KK5QT 336, N5NAV 326, W5KLV 225, K5SV 187, W5YQZ 181, KB5UCQ 124, W5TBF 86, WB5YD 85, W5RVZ 75, W5CTZ 68, K5DGM 59, WD5GKH 50, WA5FQX 36, N5LF 32, KB5RUG 24, N5OJU 22, N5MBM 15, K5GCX 4, N5JUU 3.

## QSLs by K2QFL

"Quality For Less"

Free Samples, Call or Write

Toll-Free, 1-800-442-6536, Fax: 1-800-247-3299

Greg W. Eckert, 7 Carlton Ave., Washington, NJ 07882

From \$24.50/1,000 cards. MRC's, Economy to

Full Color custom cards.

Special 25% off eyeball cards with accompanying QSL order.

Excluding Super Economy cards.

# Frequency Counters

# RF Science & Technology

P.O. Box 606, 21 Market St N., Smiths Falls, Ont. K7A 4T6 Canada  
 phone: (613)283-5195 fax (613)283-0637  
 e-mail: rftech@falls.igs.net

**MIC-1028**

**MIC-10C28**



**All of the features without the glossy colour ads (ie. the high cost).  
 Rugged, portable, accurate. Order direct and now save even more.**

*This is a special introductory offer, may expire without notice.  
 Please allow 4 to 6 weeks for shipment - add \$9 S&H within continental U.S.A.*

**MIC-1028**

**Only \$134.95 USD**

- 10 Hz to 2.8 GHz
- Frequency, Period, and Auto Trigger & Hold functions
- Dual 50 Ohm / 1 MegOhm Inputs, standard BNC connector
- High Speed 250 MHz Direct Count for High Resolution
- 10 Digit LCD Display with switchable backlight
- 4 User selectable Gate Times
- 16 Segment Bargraph for RF Signal Strength
- 6 Hour NiCad Operation

**MIC-10C28**

**Only \$99.95 USD**

- 1 MHz to 2.8 GHz
- 50 Ohm Input Impedance, standard BNC Connector
- High Speed 250 MHz Direct Count for High Resolution
- 4 User Selectable Gate Times
- 16 Segment Bargraph for RF Signal Strength
- 6 Hour NiCad Operation
- complete with Extendable Antenna

Visit our web site to see our other great buys <http://www.falls.igs.net/~rftech>

Want to reap the rewards of teaching ham radio? Ask ARRL Educational Activities Department for your free package on teaching youth or adults.

## ANTIQUE RADIO CLASSIFIED

**Free Sample!**

Antique Radio's  
 Largest Circulation Monthly.  
 Articles, Ads & Classifieds.

Also: 40's & 50's Radios, Ham Equip., Early TV,  
 Books & more. Free 20-word ad each month.  
 6-Month Trial: \$19.95. 1-Yr: \$38.95 (\$55.95 1st Class).  
 A.R.C., P.O. Box 802-B18, Carlisle, MA 01741  
 Phone: (508) 371-0512 VISA/MC Fax: (508) 371-7129

## Quality Microwave TV Systems

WIRELESS CABLE - ITFS - MMDS  
 ATVs - INTERNATIONAL - S-BAND  
 Amplifiers • Antennas • Books • Components  
 Filters • Systems • Video Products  
 • RF Frequency 1990 - 2700 MHz  
 • Cable Ready - VHF - UHF Outputs  
 • SASE For "FREE" Catalog or Send \$1

## PHILLIPS-TECH ELECTRONICS

PO Box 8533 • Scottsdale, AZ 85252  
 ORDER LINE 800-880-MMDS  
 CATALOG / INFO 602-947-7700  
 FAX LINE 602-947-7799  
 Visa • M/C • Amx • Disc • COD's • Qty Pricing



## HF • VHF/UHF MOBILES • VHF/UHF HANDHELDS In Stock at all AES Stores - Check our Prices!

DJ-C41T  
 DJ-C11T



### HANDHELDS

DJ-G1T 2m HT/batt/cgr/scope	\$229 <sup>95</sup>
DJ-G5TH 5W 2m/440 FM HT/cgr	\$359 <sup>95</sup>
DJ-G5TY 2W 2m/440 FM HT/cgr	\$339 <sup>95</sup>
DJ-S11T 340mW 2m HT/AA batt hdr... <b>Hol Spec</b>	\$114 <sup>95</sup>
DJ-S41T 340mW 440 HT/AA battery holder	\$119 <sup>95</sup>
DJ-191T 1.5W 2m FM HT/batt/cgr/TP	\$209 <sup>95</sup>
DJ-191TH 5w 2m FM HT/batt/cgr/TP	\$229 <sup>95</sup>
DJ-480T 440 FM HT/batt/cgr/TP... <b>CLOSEOUT</b>	\$219 <sup>95</sup>
DJ-C11T* 2M 300mW/cc size HT/lith batt	\$179 <sup>95</sup>
DJ-C41T* 440 300mW HT/cc size/lith batt	\$179 <sup>95</sup>

DR-150T



### MOBILES

DR-140T 50w 2m FM xcvr/TTP mic	\$259 <sup>95</sup>
DR-140TQ 50w 2m FM w/CTCSS decoder	\$279 <sup>95</sup>
DR-150T 50w 2m FM xcvr/TTP mic/9600	\$289 <sup>95</sup>
DR-150TQ 50w 2m FM w/CTCSS decoder	\$309 <sup>95</sup>
DR-430TQ 440 FM xcvr w/CTCSS decoder	\$279 <sup>95</sup>
DR-605T 50W 2m/35W 440 FM xcvr w/TTP	\$459 <sup>95</sup>
DR-605TQ 50W 2m/440 w/CTCSS decoder	\$499 <sup>95</sup>
DR-610T 50W 2m/35W 440 FM xcvr w/TTP	\$599 <sup>95</sup>

DR-610T



All Prices are subject to change without notice.  
 \*DJ-C11T/DJ-C41T no internal speaker, must use earphone

DX-70T/TH



### HF + 6 meters

DX-70T Compt HF/10W 6M xcvr <b>Holiday Spec</b>	\$839 <sup>95</sup>
DX-70TH Compact HF/100W 6M xcvr	\$969 <sup>95</sup>
DX-77T 160-10M 12V Base xcvr	\$949 <sup>95</sup>
DM-340MVT 30 Amp Power Supply	\$179 <sup>95</sup>

Your Ham Radio Club can benefit when  
 you purchase from AES!

For Information about our Club Program contact  
 Mike Hansen, N9LBQ at AES Milwaukee.

1-800-558-0411



**ORDER TOLLFREE: 1-800-558-0411 • www.aesham.com**

# AMATEUR ELECTRONIC SUPPLY® INC.

5710 W. Good Hope Road; Milwaukee, WI 53223 • 414-358-0333 • fax: 414-358-3337 • Toll Free: 1-800-558-0411

BBS: 414-358-3472 • www: [www.aesham.com](http://www.aesham.com) • e-mail: [help@aesham.com](mailto:help@aesham.com)

## AES® BRANCH STORES

### WICKLIFFE, OH

28940 Euclid Avenue  
 Wickliffe, OH 44092  
 440-585-7388  
 1-800-321-3594  
 fax: 440-585-1024

### ORLANDO, FL

621 Commonwealth Ave.  
 Orlando, FL 32803  
 407-894-3238  
 1-800-327-1917  
 fax: 407-894-7553

### LAS VEGAS, NV

1072 N. Rancho Drive  
 Las Vegas, NV 89106  
 702-647-3114  
 1-800-634-6227  
 fax: 702-647-3412

### STORE HOURS

Monday thru Friday

9:00 AM to 5:30 PM

Saturday

9:00 AM to 3:00 PM

**OVER 40 YEARS IN  
 AMATEUR RADIO!**

# AUTO/HOME INSURANCE OFFERED NATIONWIDE

## STOP HAMMING IT UP AND LOOK AT WHAT WE HAVE

For over 40 years Sneed, Robinson & Gerber, Inc. has provided superior protection for its customers. Now, we are offering a specially packaged Auto/Home insurance program nationwide. It even includes the catastrophic ridden states such as New York, New Jersey, California (earthquake included), Texas, Florida, etc. SRG has flexible coverage levels to meet every family's needs.

## EASY QUOTES, AT THE PUSH OF A BUTTON OR MOUSE

You can apply over the phone to SRG's toll-free number for personal assistance, or on-line over your personal or business computer to our web site. Either way, you'll have the convenience of a complete response, with your personal rate quote. SRG's user friendly web site includes policy features and interactive capabilities to receive a quote on-line.

## CONVENIENT, HASSLE FREE CLAIM SERVICE

The SRG program offers nationwide, fast and courteous claim service and local claim adjusters, 365 days a year, simply by calling our toll-free claim number.

*Call for a prompt, no obligation quotation*

1-800-619-7827 ext. 129

Visit our web site at:  
[www.sneedcompanies.com](http://www.sneedcompanies.com)



Sneed Building  
6645 Stage Road  
Memphis, TN 38134  
(901) 372-4580



*For All the Commitments You Make®*

# NiMH/NiCD BATTERIES

INNOVATIVE VALUE LEADER

## NiMH/NiCD BATTERIES PACKS

## SPEAKER/MICS

Replacement for Yaesu, Kenwood, Icom, Standard, Alinco, Motorola.

- Excellent quality
- Innovative design
- Competitive prices
- Prompt delivery



We also offer  
**TWIN RAPID CHARGER**  

- Universal type
- Twin sites for NiMH/NiCD

OEM, Rep., Distributor & Wholesale are Welcome

# Ariq Industrial Corp.

1026 East Lacy Ave., Anaheim, CA 92805  
(714)533-3020 • Fax: (714)758-4825

## MININEC for Windows

by J. Rockway and J. Logan

New antenna design/modeling software.

Design Long Wires, Yagi's & Quads!

### Features Include:

- MININEC for Windows is New!
- This is not another DOS version.
- On-line context sensitive help.
- Real time diagnostics.
- Up to 800 unknowns.
- Visualize & rotate geometry & results in 3-D.
- A fully Windows application (Windows 3.11, Windows 95, Windows NT).

### Special limited time offer for Hams:

- Ham Radio price \$99.95  
(Regularly \$125)
- Offer extended through Jan. '98
- Mention this ad and include your call sign with your order to obtain the discount.

ORDER TODAY from:

**EM Scientific, Inc.**  
2533 N. Carson Street, Suite 2107  
Carson City, NV 89706

TEL: (702) 888-9449  
FAX: (702) 883-2384  
TELEX: 170081

E-MAIL: [76111.3171@compuserve.com](mailto:76111.3171@compuserve.com)

For more information, visit our WEB Site.  
WEB SITE: <http://www.emsci.com>

The **BEST**  
in  
Mobile  
Mounts



Request FREE Catalog! <http://www5.interaccess.com/ixeqpt>

**ILX EQUIPMENT LTD**  
P.O. Box 9  
Oak Lawn, IL 60454  
708-423-0605  
FAX 708-423-1691  
e-mail: [ilx@interaccess.com](mailto:ilx@interaccess.com)



## KENT MORSE KEYS



*Quality British Made Morse Keys*

Send NOW for our  
new catalog on  
our full range  
of morse keys,  
keyers and  
electronic kits



**R.A. KENT ENGINEERS**  
P.O. BOX 1225, MOUNT IDA  
AR 71957-1225  
TEL:(870)867-4550 FAX:(870)867-2019

# YAESU

## HF/VHF/UHF Ham Equipment Handhelds • Rotators



HF  
Base &  
Mobile

FT-1000 HF Transceiver • tx: 160-10m rx: 100kHz-30MHz • 200W • 100 memories • dual receive • antenna tuner & AC • 6" x 16" w x 15" d, 58 lbs. .... **\$3299<sup>95</sup>**

FT-1000D Deluxe • dual bandpass filter • temperature compensated crystal oscillator • 2.4kHz & 2kHz SSB filters, 500Hz CW crystal filter ..... **\$4199<sup>95</sup>**

FT-1000MP • Advanced features • EDSP • Collins mech filter ..... **SPECIAL \$2899<sup>95</sup>**

FT-1000MP/DC DC only. **SPEC \$2749<sup>95</sup>**

**FREE  
YSK-900  
Remote  
Kit!**

FT-900/AT  
FT-900/CAT  
Limited Time

FT-900/AT HF Transceiver 100kHz-30MHz receive • 100W • 100 memories • auto antenna tuner • CTCSS encode • repeater offset • twin VFOs • detachable front sub-panel • 13.8VDC @ 20A • 9" w x 3 3/8" h x 10" d, 11 lbs. .... **CLOSEOUT \$1269<sup>95</sup>**

with INSTANT COUPON until gone!

FT-900/CAT (Collins mech. filter) .. **\$1369<sup>95</sup>**

**Affordable  
Beginner's  
Radio!**



FT-840 HF Transceiver • tx: 160-10m • rx: 100kHz-30MHz • 100 memories • 100W • twin VFOs • opt. FM • repeater offset • CTCSS encode • 13.8V DC @ 20A • 10" w x 3 3/8" h x 9 1/4" d, 18 lbs. .... **\$899<sup>95</sup>**

### MISC. CLOSEOUT & SPECIALS

MMB-21 Mobile bracket; 09/727R ..... **\$69<sup>95</sup>**

MW-2 Remote control wireless mic. .... **\$99<sup>95</sup>**

MMB-54 Mob. brkt; FT-415/530 ..... **\$99<sup>95</sup>**

FRC-4 Pager unit; 5200/6200 ..... **\$199<sup>95</sup>**

FRC-6 Pager unit; 2500M/7400MHz ..... **\$199<sup>95</sup>**

FTS-6 Encoder/decoder; 09 series ..... **\$99<sup>95</sup>**

CSC-35 Case; FT-411E w/FNB-17 ..... **\$99<sup>95</sup>**

### INSTANT COUPONS thru 11/30/97

The prices shown in this ad already have these Instant Coupon Amounts deducted

FT-50RD/40B, 41B ..... **\$20 Off**

FT-1000, FT-1000D ..... **\$200 Off**

FT-2500M ..... **\$30 Off**

FT-920 ..... **\$100 Off**

FT-8100R ..... **\$35 Off**



New FT-920 HF xcvr w/6M, AF-DSP, antenna tuner, keyer & more! .... **SPECIAL \$1699<sup>95</sup>**



Multi-  
Mode  
VHF/UHF  
Base

FT-736R • 2m: 144-148MHz; 70cm: 430-450MHz • opt. modules for 50, 220MHz & 1.2 GHz • 100 memories • full duplex crossband • inverted tracking • 25W 2m, others: 10W: 50/1.2GHz • built-in AC or 13.5V DC • 5" x 14" w x 11" d, 19.8 lbs ..... **\$1969<sup>95</sup>**



Dual Band  
FM  
Mobile

32 memories • CTCSS encode • dual receive • built-in duplexer • crossband repeat • remoteable • 5 1/2" w x 1 1/2" h x 6" d, 2 lbs

FT-6200 440MHz/1.2GHz, 35/10w .... **\$749<sup>95</sup>**



FT-8100R Compact Dual Band FM • 2m 144-148MHz tx, 110-550 & 750-1300 MHz (cell blk'd) rx; 70cm 430-450MHz tx/rx • 208 memories • 50-35/3/5W • CTCSS encode • autodialer • 5 1/2" w x 1 1/2" h x 6 1/4" d, 2.8 lbs. .... **\$544<sup>95</sup>**

w/ INSTANT COUPON



Single Band  
FM  
Mobile

FT-7200 430-450MHz FM Mobile • 35W • 50 memories • DTMF page and coded squelch • backlit DTMF mic • 5 1/2" w x 1 1/2" h x 6" d, 2.8 lbs. .... **CLOSEOUT \$249<sup>95</sup>**



FT-3000M 2M FM • 70W • 110-180MHz, 300-520, 800-999MHz rx (cell blk'd) • 81 memories • 1200/9600b compatible • 5 1/2" w x 1 1/2" h x 6 1/4" d, 2.4 lbs. .... **HOLIDAY SPEC \$439<sup>95</sup>**



Single Band  
FM  
Mobile

Similar looks & features: • 31 memories, odd splits • alpha-numeric display • CTCSS encode • 5 scanning functions • track tuning • backlit DTMF mic • 6" w x 1 1/2" h x 7" d.

FT-2500M (2m) 144-148MHz tx, 140-174MHz rx, 50/10/5W .... **\$299<sup>95</sup>**

FT-7400H (70cm) 430-450MHz transmit and receive, 35/15/5W .... **\$499<sup>95</sup>**

**VHF/UHF Multi-Purpose Mobile/Portable**  
25W • FM/SSB/CW or 2W portable power with 12VDC at 1A or opt. battery case • dual VFOs • LCD display • 10 memories • DTMF up-down mic scanning • 2 1/2" h x 6 1/2" w x 7 1/2" d, 2.5 lbs.

FT-290RMKII 144-148MHz tx/rx. .... **\$629<sup>95</sup>**

FT-690RMKII 50-54MHz, 10W **SPEC \$569<sup>95</sup>**

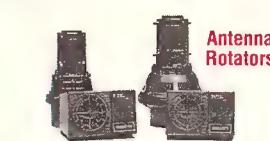
FT-790RMKII 430-450MHz tx/rx. .... **\$719<sup>95</sup>**

**YAESU/VERTEX VHF/UHF Repeaters**  
25W • 8 channels • PLL synthesized • Fully programmable • CTCSS encode & decode • time out & hang timers • wall or rack mt. • 13.8V @ 6A • 14 1/4" x 14" x 4", 25 lbs

VXR-5000VADC 135-175MHz .... **\$1199<sup>95</sup>**

VXR-5000UCDC 400-512MHz .... **\$1199<sup>95</sup>**

VXD-40UB VHF Duplexer .... **\$199<sup>95</sup>**



Antenna  
Rotators

Light, Medium, Heavy & Extra Heavy-Duty models, plus Elevation & Azimuth - Elevation.

G-450XL Lt/medium, 10 sq. ft. .... **\$239<sup>95</sup>**

G-800S Medium, 17 sq. ft. .... **\$339<sup>95</sup>**

G-800SDX Same, w/presets .... **\$429<sup>95</sup>**

G-1000SDX Heavy, 23 sq. ft. .... **\$519<sup>95</sup>**

G-2800SDX Extra HD, 23 sq. ft. .... **\$1139<sup>95</sup>**

G-5400B Azimuth/elev.11 sq. ft. .... **\$539<sup>95</sup>**

G-500A Elevation, 12 sq. ft. .... **\$279<sup>95</sup>**

### Misc Items

FT-23R-12 5W 2M HT .... **\$219<sup>95</sup>**

FT-23R-17 2.5W 2M HT .... **\$199<sup>95</sup>**

MD-1C8 Desk mic. (hard to find but still in stock at AES!) .... **CLOSEOUT \$122<sup>95</sup>**



Handhelds

FT-10 2 1/2 w 2m HT (several models) .... **CALL**

FT-11R 1.5w 2M HT .... **SPECIAL \$229<sup>95</sup>**

FT-11R/HP 5w 2M HT .... **SPECIAL \$269<sup>95</sup>**

FT-33R 5w 220 MHz FM HT .... **\$299<sup>95</sup>**

FT-40 440MHz HT (several models) .... **CALL**

FT-41R 440MHz HT .... **CLOSEOUT \$299<sup>95</sup>**

FT-50RD/40B 2w w/FTT-12 .... **\$329<sup>95</sup>**

FT-50RD/41B 5w w/FTT-12 .... **\$339<sup>95</sup>**

FT-51R 2w 2m/440 .... **\$469<sup>95</sup>**

FT-51R/HP 5w 2m/440 .... **\$489<sup>95</sup>**

FT-411E 2.5w 2 meter FM HT .... **\$259<sup>95</sup>**

FT-911 1w 1.2GHz HT .... **\$469<sup>95</sup>**

FNB-25G 600mA 7.2V gray battery pack for FT-26/415/416/530. .... **CLOSEOUT \$19<sup>95</sup>**

FNB-27G 600mA 12V 5W gray battery for FT-26/415/416/530. .... **CLOSEOUT \$29<sup>95</sup>**

FNB-49 600MA 6V battery; FT-10 FT-40, FT-50R **\$29<sup>95</sup>** • with radio purchase.... **\$19<sup>95</sup>**

**New!**

VX-1R 500mw 2m sub-mini HT. .... **\$289<sup>95</sup>**

**Communications Receiver**

FRG-100B 50kHz-30MHz, SSB/CW/AM modes, FM opt. • 50 memories • Clock • Selectable bandwidths • dual antenna inputs • 9 1/4" w x 3 3/8" h x 9 1/4" d.... **\$619<sup>95</sup>**

### Items not Pictured

FT-600 Commercial grade HF .... **\$899<sup>95</sup>**

FT-8500 2M/440 xcvr .... **SPEC \$599<sup>95</sup>**

FT-8500 w/MH-39 2M/440 **SPEC \$549<sup>95</sup>**

FP-1025A 20A switching p/s. .... **\$179<sup>95</sup>**

FP-1030A 25A p/s w/meters.. .... **\$249<sup>95</sup>**

FP-712 10A switching power sup .... **\$129<sup>95</sup>**



### QUADRA SYSTEM HF/6-METER AMPLIFIER

• Amateur Band Coverage: 160-15 & 6 meters

• 1000W Power Out @ 220V AC 500W on 6-meters

• Built-in High-Speed Antenna Tuner

• (2) RF inputs • (4) RF outputs

• Automatic Bandswitching with Yaesu's FT-1000D, FT-1000MP, FT-920 & FT-900

• Separate Amplifier and Power Supply Units

• Size: (each) 16 1/4" x 5 3/4" x 16 1/4"

• Weight: (Amp) 33 lbs; (Power Supply) 26 lbs

**\$4999<sup>95</sup>**

**ORDER TOLL FREE: 1-800-558-0411 • www.aesham.com**

**AMATEUR ELECTRONIC SUPPLY<sup>®</sup>**

5710 W. Good Hope Road; Milwaukee, WI 53223 • 414-358-0333 • fax: 414-358-3337 • Toll Free: 1-800-558-0411

BBS: 414-358-3472 • Internet: [www.aesham.com](http://www.aesham.com) • e-mail: [help@aesham.com](mailto:help@aesham.com)

### AES<sup>®</sup> BRANCH STORES

**WICKLIFFE, OH**  
28940 Euclid Avenue  
Wickliffe, OH 44092  
440-585-7388  
1-800-321-3594  
fax: 440-585-1024

**ORLANDO, FL**  
621 Commonwealth Ave.  
Orlando, FL 32803  
407-894-3238  
1-800-327-1917  
fax: 407-894-7553

**LAS VEGAS, NV**  
1072 N. Rancho Drive  
Las Vegas, NV 89106  
702-647-3114  
1-800-634-6227  
fax: 702-647-3412

**STORE HOURS**  
Monday thru Friday  
9:00 AM to 5:30 PM  
Saturday  
9:00 AM to 3:00 PM  
**OVER 40 YEARS IN  
AMATEUR RADIO!**

**HamCall™ CD-ROM**  
U.S. and International  
Over 1,454,000 Listings

**HamCall has been  
rated one of the  
"top 100" CD-ROM's  
by PC Magazine!**



**Features & Benefits:**

HamCall allows you to quickly and easily look up over 1,454,000 callsigns from all over the world, including nearly 300 DX call areas. The new October 1997 HamCall now includes listings for Australia.

The same CD works in DOS, Windows 3.x, Windows 95, and Macintosh. On a PC running Windows or DOS, you can look up hams by call, name, address, city, state, ZIP, call sign suffix, county, and now SOUNDEX last name searching. PC's can also view photographs, EDIT records (now includes fax number field), and calculate BEAM HEADING and DISTANCE. Macs can retrieve by call, last name, and ZIP.

Data displayed includes: callsign, name, address, city, state, ZIP code, country, license issue date, expiration date, birth date, previous call, previous class, latitude, longitude, grid square, time zone, area code, county, QSL manager, e-mail address, and WWW URL.

- Displays precise latitude/longitude for almost every U.S. and DX call.
- Supported by many logging programs and packet BBS systems.
- Calculates beam heading and distance from your home QTH automatically. Distance is measured in miles and kilometers.
- Prints standard 1-up labels for QSL cards, and can now print all information for each ham. The October 1997 edition has enhanced label printing capabilities for Windows. You can pick the printer and font, and print almost any size labels. Label size, margins, columns, and rows are fully configurable.
- Supports copy and paste between Windows applications.

HamCall includes 143,245 cross references from old to new calls, over 3,400 photographs, 46,256 e-mail addresses, and much more.

HamCall is issued twice a year, at the end of April and October. It is available directly from Buckmaster or through selected dealers. Dealer discounts of 40% when buying quantities of 25 or more. Same low price of \$50.00 plus \$5.00 shipping U.S. and \$8.00 international.



**BUCKMASTER**

6196 Jefferson Highway  
Mineral, VA 23117



540-894-5777 800-282-5628  
540-894-9141(fax)

e-mail: [info@buck.com](mailto:info@buck.com)

**Are You An ARRL  
Volunteer Examiner?**

If you're 18 or older, and a qualified **General, Advanced** or **Extra** class licensee, you're invited to join us. For details call:

**1-800-9-ARRL-VEC**



**THE ORIGINAL WD4BUM  
HAM STICK™  
ANTENNAS**  
for HF MOBILE OPERATION  
**\$19.95 each**

The only lightweight HF mobile antenna recommended by noted author Gordon West, WB6NOA

- Monobanders for 75 to 6 meters.
- Very rugged fiberglass & stainless steel.
- Telescopes for easy adjustment.
- 3/8 x 24 TPI base fits most mounts.
- Low profile & low wind load.
- Needs no springs or guys.
- Complete tuning & matching instructions included.
- Approximately 7 ft. tall.
- 600 watts.

Cat. #	Band	Cat. #	Band
9175	75 meters	9115	15 meters
9140	40 meters	9112	12 meters
9130	30 meters	9110	10 meters
9120	20 meters	9106	6 meters
9117	17 meters		

**Lakeview Company, Inc.**

3620-9A Whitehall Rd., Anderson, SC 29626 • 864-226-6990  
FAX: 864-225-4565 • E-Mail: [hamstick@hamstick.com](mailto:hamstick@hamstick.com) • [www.hamstick.com](http://www.hamstick.com)

**ALL 100% MADE IN USA** Add \$7 per order S/H

**NEW ENHANCED  
DISCONE  
SCANNER ANTENNA**

**Only \$36.95**



- 800 To 900 MHz enhancement.
- Transmit on 146, 220, and 440 amateur bands.
- Rated to 150 Watts.
- Compact, will fit in 36" x 36" space.
- Receives all AM-FM & SSB frequencies.
- Gain improves with frequency increase.
- Mounts to any vertical mast 1" to 1 1/2".
- Aluminum mount & elements.
- 8 cone & 8 disk elements—same as other discones selling for nearly 3 times our price
- Accepts standard PL-259 connector.
- For type "N" connector add \$5.00

**MOBILE COLINEAR  
ANTENNAS**

**THE ULTIMATE PERFORMER**

- Honest 4.5dB gain.
- 1000 watts DC.
- 17-7 ph stainless steel top sec.
- Rugged fiberglass base station
- Base fitting is std. 3/8 x 24 TPI.

Length

9007 - 146 MHz 7' 2" • 9038 - 220 MHz 4' 9"

9440 - 440 MHz 2' 5"

**\$19.95**

Base station  
version available  
9007-B • 9038-B • 9440-B  
**\$29.95**

**Tri-Magnetic Mount  
MODEL 375**

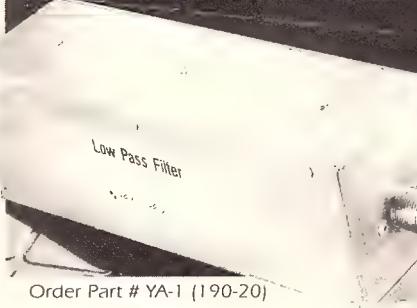
**Only \$39.95**



Now with no-rust  
all stainless steel  
hardware

- Holds all Hamstick Antennas and many others.
- Over 400# of holding power.
- 12" X 14" foot print.
- 3/8 x 24 thread mounting.
- 17' RG 58 coax w/PL-259.
- No rust aluminum construction.

**Tired of being the Channel Master?  
We help keep you QRV**



Order Part # YA-1 (190-20)

**LOW PASS FILTER**

WORKING RANGE: 1.8 - 29.7 MHz

IMPEDANCE: 50 Ohms

POWER RATING: 1.5Kw continuous,  
5Kw peak

ATTENUATION: 80db @ 54 MHz

INSERTION LOSS: <1.2:1 SWR or

<0.2db @ 29.7 MHz

**CALL OR WRITE FOR FREE BROCHURE!**

**bencher, inc.**

TEL: 630-238-1183 FAX: 630-238-1186  
831 N. Central Ave., Wood Dale, IL 60191 USA

**HI-FI AMATEUR TELEVISION for 900, 1200 or 2400MHz**

People all over are realizing the benefits of FM television transmission. Bring your ATV station into the 21st Century!

- Synthesized FM video/audio transmitters with over 1W (TX930, TX1300) and 0.5W (TX2500) RF output.
- Linear, low noise downconverters may be used for both FM as well as AM amateur television signals.
- SAW filter and PLL video/audio detector provide the most stable and sensitive detection scheme available.
- Send perfect FM video pictures 3 - 5 times farther than comparable AM systems with a typical "P5" picture sensitivity of -80dBm. That's 10 to 15dB less signal required than with AM television!
- Add RF power amplifiers (1, 2 or 3 cascaded) with no picture degradation or transmitter realignment!
- Perfect for NASA Select, weather radar, or sending (and receiving) highly detailed pictures crisp and clear.
- Use any standard (or Hi-Band) cam-corder, video cassette recorder, or graphics computer with composite video/audio outputs and transmit television signals with full rate (fast scan) NTSC video and Hi-Fi audio!



Call or write for details on our complete  
line of ATV transmitters and receivers.  
- VISA and Mastercard Accepted -  
Engineered and Manufactured in the USA

**High Frequency Technology, Inc.**  
457 Santa Fe Trail  
Cary, Illinois 60013-1981  
Phone/FAX (847) 639-4336

# KENWOOD

## HF/VHF/UHF Amateur Radio Equipment



### TS-570D HF Transceiver

160-10M Amateur Band operation • 500kHz-30MHz receive • 100W output • Automatic antenna tuner • 16-bit DSP technology • Scrolling menu; 46 types of functions Dedicated packet port • RS-232 port for up to 57,600 bps PC control • Electronic keyer **w/instant coupon\* \$1289<sup>95</sup>**

**TS-570S** Similar to TS-570D but includes the 6 meter band and DSP feature.....**w/instant coupon\* \$1549<sup>95</sup>**



### TS-870S HF Transceiver

160-10M Amateur Band operation • 100kHz to 30MHz General Coverage receiver • 100W output • IF-Digital Signal Processing function • AIP system • Variable AGC Voice equalizer • Speech processor • Electronic keyer Multiple scanning modes • Menu function • 13.8V DC @ 20A • 13" w x 4 1/4" h x 13" d, 25 lbs.....**\$2299<sup>95</sup>**

#### Other KENWOOD

Welcome to Amateur Radio PRIMER ..... **50¢**  
**BC-15A** Desktop Quick-Charger ..... **CLOSEOUT \$49<sup>95</sup>**  
**SC-35** Case for TH-78A w/PB-13/BT-8 ..... **CLOSEOUT 99<sup>95</sup>**  
**SC-36** Case for TH-78A w/PB-17/18 ..... **CLOSEOUT 99<sup>95</sup>**  
**MC-45DM** Multi-function TT mic ..... **SPECIAL 39<sup>95</sup>**  
**PB-32** 6V, 600mA. battery ..... **SPECIAL 29<sup>95</sup>**  
**PB-32** with Kenwood Radio Purchase ..... **SPECIAL 19<sup>95</sup>**  
**TM-255A** 2M SSB/FM xcvr/9600 baud **CLOSEOUT 899<sup>95</sup>**  
**TM-331A** 25W 220MHz FM Transceiver/ TTP ..... **499<sup>95</sup>**  
**TM-V7A** 50W 2m/35W 440...**w/instant coupon\* 499<sup>95</sup>**  
**TS-790A** 2M/440 SSB/FM xcvr **w/free duplexer** **1799<sup>95</sup>**  
**TS-950SDX** Deluxe HF transceiver ..... **3999<sup>95</sup>**

#### Announcing!...

### the New TH-G71A Dual Band Handheld

Ergonomic design • Large back-lit keypad & display • 6 character alphanumeric • CTCSS tone scan • Multiple scan modes • Wide range receive including aircraft • 3 power levels CTCSS encode/decode • 10 DTMF autopatch memories • MIL-STD 810E for rain & shock resistance • PC programmable plus DTMF remote control to your Kenwood TM-V7A.

**TH-G71AK2** 3W 2M/440 HT ..... **\$359<sup>95</sup>**  
**TH-G71A** 5W 2M/440 HT ..... **369<sup>95</sup>**



### TS-50S HF Transceiver

Super compact! • 160-10M Amateur Band operation 500kHz-30MHz General Coverage receiver • 100W output Dual vfos • DDS (Direct Digital Synthesizer) with "fuzzy-logic" control • AIP system • 100 memory channels Dual-menu system • Multi-function microphone • 12V DC @ 20A • 7" w x 2 1/2" h x 9" d, 6 1/2 lbs.....**\$849<sup>95</sup>**

### TS-60S VHF Transceiver

All-mode 50MHz transceiver with 90W output. Same features and looks as the TS-50, above .....**\$999<sup>95</sup>**



**FREE  
Duplexer!**  
*Wanted Right Now!*

### TM-742AD Dual Band FM Transceiver

144MHz/440MHz dual-band operation • 50/35W output 4 band options for tri-band operation • Dual/triple band receive • 101 mem channels/band • Detachable display & control panel (optional) • Backlit display • 13.8V DC @ 11A • 9" w x 2" h x 6 1/2" d, 3.3 lbs.....**HOLIDAY SPECIAL \$689<sup>95</sup>**

### TS-642AD Dual Band Transceiver

Same features and looks as the TS-742AD but 144MHz and 220MHz dual-band operation .....**\$739<sup>95</sup>**

**TM-642A** same, but no backlit display **CLOSEOUT 729<sup>95</sup>**

**UT-50S** 50MHz band option ..... **329<sup>95</sup>**  
**UT-220S** 220MHz band option ..... **329<sup>95</sup>**  
**UT-440S** 440MHz band option ..... **299<sup>95</sup>**  
**UT-1200** 1200MHz band option ..... **399<sup>95</sup>**

#### While they Last!

**UT-28S** 28MHz band option for TM-62AD, TM-742AD, etc ..... **CLOSEOUT \$149<sup>95</sup>**

### TH-235A, TH-235AH & TH-235AK2 BATTERY PACK PROMOTION

With the purchase of every TH-235A, TH-235AH & TH-235AK2 you will receive a **FREE BT-10 Battery Case**. Limited time!

**Latest New, Used & Demo Pricing is  
available on our Web Page.**



*Affordable  
Beginner's  
Radio!*

### TM-261A 2M FM Transceiver

144-148MHz tx; 118-174MHz rx • 50W output • MIL-STD 61 multi-function memory channels plus 1 call channel Memory name function • DTSS selective calling • Multi-scan capability • Dual menu system • Multi-function mic with backlit keys • DTMF mem. function CTCSS tone encoder; optional decoder • 13.8V DC @ 11A Compact! 5 1/2" w x 6 1/2" h x 6 1/2" d, 2.2 lbs **w/instant coupon\* \$249<sup>95</sup>**

### TM-461A 70cm FM Transceiver

Same features and looks as TM-261AD but 438-450MHz transmit, 400-470MHz receive, 35W output.....**\$439<sup>95</sup>**



**New!** **TH-235A** 2M, single band operation • Friendly menu system • Wireless cloning • Channel number display • 60 non-volatile memory channels • built-in CTCSS encoder and optional decoder • DTSS selective calling • Powerful multi-scan capability • DTMF memory function stores ten 16-digit DTMF codes with ID • 1.5W output standard, 5W with optional battery.....**SPECIAL \$169<sup>95</sup>**

**TH-235AH** 5W version of above.....**\$199<sup>95</sup>**

**TH-235AK2** as above, no batt.or chgr...**SPECIAL \$139<sup>95</sup>**

**TH-22AT** 144MHz single band oper. • MOS FET power module • 3W output • DTMF keypad • 40 mems, 1 call channel • Multiple scan functions (VFO, call, mem.) Dual scan stop modes 2.2" w x 5.7" h x 1.0" d **w/instant coupon\* \$229<sup>95</sup>**

**TH-22ATH** 5W version .....**w/instant coupon\* 259<sup>95</sup>**

**TH-42AT** 440MHz version .....**339<sup>95</sup>**

**TH-48A** 70cm, 144MHz rx, single band transmit and dual-band receive capability - includes 2M • 2W output Alphanumeric memory • Alphanumeric paging • 40 multi-function memory channels • Tone alert system with time indicator • 1.95" w x 4.56" h x 1.49" d .....**CLOSEOUT 249<sup>95</sup>**

**TH-79A(D)** 2M/440MHz dual band • 2.7W output • MOS FET power module • Dual receive • Cross-band repeat • 82 memories • ID & DTMF memory • CTCSS encoder/decode • 2.2" w x 5.1" h x 1.0" d .....**w/instant coupon\* \$349<sup>95</sup>**

**TH-79A(D)H** 5W version .....**w/instant coupon\* 369<sup>95</sup>**

\*INSTANT coupons expire 12/31/97

**ORDER TOLL FREE: 1-800-558-0411 • www.aesham.com**  
**AMATEUR ELECTRONIC SUPPLY<sup>®</sup>**  
 INC.

5710 W. Good Hope Road; Milwaukee, WI 53223 • 414-358-0333 • fax: 414-358-3337 • Toll Free: 1-800-558-0411

BBS: 414-358-3472 • Internet: [www.aesham.com](http://www.aesham.com) • e-mail: [help@aesham.com](mailto:help@aesham.com)

#### AES<sup>®</sup> BRANCH STORES

##### WICKLIFFE, OH

28940 Euclid Avenue  
 Wickliffe, OH 44092  
 440-585-7388  
 1-800-321-3594  
 fax: 440-585-1024

##### ORLANDO, FL

621 Commonwealth Ave.  
 Orlando, FL 32803  
 407-894-3238  
 1-800-327-1917  
 fax: 407-894-7553

##### LAS VEGAS, NV

1072 N. Rancho Drive  
 Las Vegas, NV 89106  
 702-647-3114  
 1-800-634-6227  
 fax: 702-647-3412

#### STORE HOURS

Monday thru Friday

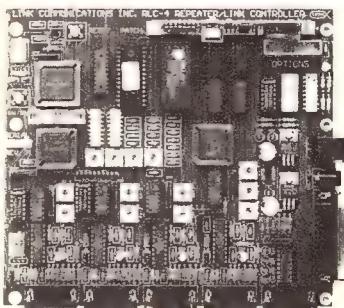
9:00 AM to 5:30 PM

Saturday

9:00 AM to 3:00 PM

OVER 40 YEARS IN  
 AMATEUR RADIO!

## 4 PORT REPEATER AND LINK CONTROLLER



### FEATURES:

- 4-full duplex radio ports
- Optional Autopatch available
- Unique CW for each port
- DTMF control from any port
- 100 user command macros
- 300-9600 baud serial port
- 4-Layer board construction
- Priced for any groups budget

## RLC-4 REPEATER CONTROLLER

### Benefits:

With DTMF and serial programming features, your controller is more secure from unwanted access. Use only 1 controller at your site to control up to 4 separate repeaters/links with their own personalities and features intact. Make emergency autopatch calls with the telephone option. Only the RLC-4 can make these features available at such a low price.

**\$449.95**

### Link Communications, Inc.

115 2nd Ave. N.E., Sidney, MT 59270

Call for information about our complete line of controllers  
(406) 482-7515 (Voice) (800) 610-4085 (Orders) (406) 482-7547 (Fax)  
<http://www.link-comm.com>



## BRAND NEW FOR 1998!

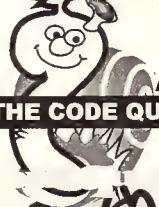
Mastering Code Was  
Never Easier or More Fun!

### WHAT ARE YOU WAITING FOR?

Code Quick is all new for 1998. Based on proven techniques, the imaginative **30 DAY MORSE SUCCESS PLAN** comes with everything you need to set the code forever in concrete. Next surge ahead to 13 or even 20 WPM with VE exam type daily drills. Your kit contains over 40 brand new power exercises to cinch your success. It works so well we can say, "If you don't pass, we'll buy it back. You'll just pay postage!" Order your copy today, and be sure to tell us your next goal. Want more info?

Call us toll free now or jump on any repeater and mention Code Quick. You'll get an earful!

**800 782-4869**



A MULTI-MEDIA APPROACH

### THE CODE QUICK 30 DAY PLAN

STILL JUST **\$43.95**  
PLUS **\$5.95 P/H**

Special upgrade prices

## CSI Autopatches

Bring you more features and value than any other brand!

### Our CS-800

converts your dual band mobile/base radios into a full duplex telephone system. Connects to mic and spkr jacks. Also has a built in repeater controller suitable for club systems.



### The CS-900

converts your simplex mobile/base radio into a superb simplex telephone system with automatic T/R switching and digital voice delay to prevent syllable/word clipping. Connects to mic and spkr jacks.



The CS-900 can also be used to add autopatch service to repeaters at sites without phone lines. Inquire.



**Connect Systems Inc.**  
2259 Portola Rd. Ventura, CA. 93003

Phone (805) 642-7184  
FAX (805) 642-7271

Email sales@connectsystems.com  
Website www.connectsystems.com

Inquire about commercial repeater panels and interconnects.

All product data and list of amateur dealers is available on our website. Or, call/fax CSI for free catalog.

CSI is a registered trademark of Connect Systems Inc.

## Amplifiers, ATV Down Converters & Hard to Find Parts

### LINEAR AMPLIFIERS

#### HF Amplifiers

PC board and complete parts list for HF amplifiers described in the Motorola Application Notes and Engineering

#### Bulletins:

AN779H	(20W)	2 Meter Amplifiers (144-148 MHz)
AN779L	(20W)	(Kit or Wired and Tested)
AN 762	(140W)	35W - Model 335A, \$79.95/\$109.95
EB63	(140W)	35W - Model 875A, \$119.95/\$159.95
AR305	(300W)	440-450 MHz Amplifiers
AN 758	(300W)	440-450 MHz Amplifiers
AR313	(300W)	440-450 MHz Amplifiers
EB27A	(300W)	440-450 MHz Amplifiers
EB104	(600W)	100W - Model KEB 67, \$159.95
AR347	(1000W)	100W - Model KEB 67, \$159.95



ATV Down Converters  
(Kit or Wired and Tested)

Model ATV-3 (420-450)  
(Ga AS - FET)

Model ATV-4 (902-926)  
(Ga AS - FET)

\$49.95/\$69.95

\$59.95/\$79.95

### HARD TO FIND PARTS

- RF Power Transistors
- Broadband HF Transformers
- Chip Caps - Kemet/ATC
- Metalized Mica Caps - Unelco/Semco
- ARCO/SPRAGUE Trimmer Capacitors

We can get you virtually any RF transistor!  
Call us for "strange" hard to find parts!

### DIGITAL FREQUENCY READOUT

For older analog transceivers  
TK-1 (Wired and Tested)\$149.95

For detailed information and prices, call or write for our free catalog!

### ADDITIONAL ITEMS

#### Heat Sink Material

Model 99 Heat Sink (6.5" x 12" x 1.6"), \$24.00  
CH-8 Copper Spreader (8" x 6" x 3/8"), \$24.00  
Low Pass Filters (up to 300W) for harmonics  
Specify 10M, 15M, 20M, 40M, 80M or 160M  
HF Splitters and Combiners up to 2KW



Add \$4.50 for shipping and handling

**CCI** Communication Concepts Inc.

508 Millstone Drive • Beavercreek, Ohio 45434-5840  
Phone: (937) 426-8600 • FAX (937) 429-3811

## REDERRING EMBROIDERY PRESENTS...

Our high-quality 100% cotton Polo Shirt with your name and callsign on left chest!  
Your choice of Red, Green, Navy or White with contrasting stitching. Sizes: S, M, L, XL, 2X. Larger sizes available. Only \$27 plus \$3 S&H

Our 100% Cotton Twill Cap with your name and callsign. Leather adjustment strap in back. Fits all normal head sizes. Your choice of Red, Dk. Green, Navy, Tan, Black or White w/contrasting stitching. Only \$10 plus \$3 S&H

Ask for our full-color, 115-page sportswear catalogue! We'll be glad to send you a copy! Shirts, jackets, activewear and accessories. Something for everyone!

VISA, MC, Amex, Discover accepted. CT Residents add 6% Sales Tax. Allow 10 days extra for personal checks to clear. We ship promptly. Your satisfaction is guaranteed.

CLUBS! Have a special event or hamfest coming up? Let us know! We'll create a custom design for you. We offer a full line of leisurewear, and our first catalogue will be out soon.. Let Rederring Embroidery help you wear your colors with pride!

We're hams working for hams, and we'll keep you in stitches!!

73, Sandy Gerli, AC1Y and Helen Ann Gerli, KA1KBY



### REDERRING EMBROIDERY

500 Country Club Road

Avon, CT 06001-2406

Tel./Fax: (860) 675-7633

E-Mail: [info@rederring.com](mailto:info@rederring.com)

# ICOM

## HF/VHF/UHF Ham Equipment



### IC-756 HF + 6M Transceiver

Big 4.9" Concentrated Information LCD Display • 5-100W output-variable • All modes • Built-in antenna tuner • Dual watch • Twin passband tuning • 101 memories • IF-DSP - Noise Reduction; IF notch filter; Selectable Audio peak; Phase Shift Network modulation/demodulation • CI-V computer interface • Memory keyer • Level/width blander controls • speech synthesizer • CW announcements • 13.8V option. • More! ..... \$1999<sup>95</sup>



### IC-775DSP HF Transceiver

200W-all modes • IF-DSP • Auto IF Notch DSP Noise Reduction • Noise Blanker PSN Modulation • Auto Peak Filter • Dual Watch • CW Pitch Control • Electronic & Memory Keyer • Power MOS FET final Built-in power supply ..... \$3999<sup>95</sup>



### IC-781 HF Transceiver

HF (150W) AM (75W) • Multi-function CRT Display • 99 Memory Channels Dual Watch • Quad Conversion • Twin Passband Tuning • Built-in Tuner • Built-in AC PS • Special Order ..... \$6599<sup>95</sup>



### IC-728 HF Transceiver

• 100W • All Modes • General Coverage Triple Conversion Receiver • Passband Tuning • Speech Compressor • 26 memories • Dual VFOs • DDS Microphone. included ..... CLOSEOUT \$999<sup>95</sup>

**ALL ACCESSORIES** for items on this page are in Stock!

All Prices are subject to change without notice.



### IC-707 HF Transceiver

100W • All Mode • General Coverage receive 32 Memory Channels • 100% Duty Cycle Minimum Number of Controls • Front Facing Spkr • Large Display ..... **SPECIAL \$729<sup>95</sup>**

**FREE OPC-581**  
Sep. Cable  
Limited Time



### IC-706 HF/VHF Transceiver

HF + 6M (100W); 2M (10W) • Detachable Control Panel/Display 101 Memories • General Coverage Receive • Noise Blanker • IF Shift • Preamp/Attenuator • CW keyer • Full Break-in (OSK) • CW Pitch • Speech Processor • VOX/XFC • LCD Display • Scroll Menu System • Tone Encode • 9 1/2" x 3 1/4" x 9 1/4" d, 9.1 lbs ..... **CLOSEOUT \$1099<sup>95</sup>**

**Net with \$100 REBATE** thru 12/31/97

**New!** IC-706 MKII **FREE OPC-581** Sep. Cable From ICOM ..... \$1299<sup>95</sup>



### IC-2000H VHF Mobile

2M FM • 50W • Wide Band Receive (118-174MHz), • 50 Memory Channels with Alpha Display • TTP mic ..... \$259<sup>95</sup>



**IC-281H:** 2M FM Transmit & Receive; 440 MHz Receive ..... **CLOSEOUT \$349<sup>95</sup>**

**IC-481H:** 440MHz FM Transmit/Receive; 2M Receive ..... **CLOSEOUT \$439<sup>95</sup>**

**Both:** 50W • 70 Allocatable Memory Channels • 10 Scratch Pad Memories • Data Switch & Connector for 9600 bps Packet



**R-8500 Receiver**  
0.1 to 2GHz (cell blk'd) **SPECIAL\* \$1749<sup>95</sup>**  
\*with INSTANT coupon thru 12/31/97

**New Low Price!**



### IC-2710H Dual Band U/V Mobile

2M (50W)/440 MHz (35W) • Detachable Control Panel • 220 Memory Channels NEW Full Control, Easy to Use Microphone (HM-98) High Speed Scanning **FREE OPC-600 Sep. Cable From ICOM** ..... \$509<sup>95</sup>



### IC-821H 2M/440 MHz Advanced Satellite & Digital Base

All Modes • 9600 Full Compatibility • Sub Band Transmit • 160 Memories • Noise Blanker • Adjustable Transmit Power Satellite Doppler Correction ..... **\$1749<sup>95</sup>**



**IC-T22A Affordable Beginner's HT!** 2M • 3W (5W @ 13.5V) • Small, easy to use • Alphanumeric Display • Air Band Rx • 80 Mem; 40 w/alpha display **HOLIDAY SPEC\$229<sup>95</sup>**

**IC-T42A** Same as IC-T22A but 440MHz coverage ..... **CLOSEOUT \$259<sup>95</sup>**

**New!** IC-T2A 2M FM HT w/8-AA batteries and charger ..... **HOLIDAY SPECIAL \$159<sup>95</sup>**

**IC-T7A/HP** 2M/440MHz Dual Band • Dual Bander at a Single Bander Size and Price • Easy! Works One Band at a Time • 4W (2M) 3W (440MHz) @ 13.5V • No Function Key and "Intuitive" Help Function • Encode/Decode built-in ..... **HOLIDAY SPECIAL \$269<sup>95</sup>**

**IC-W32A** 2M/440MHz Dual Band • 3W, 5W with BP-173 • Independent band controls • Simultaneous receive of both bands • 200 Memories (100 per band) with Name capability • Cloning capability • Built-in encoder/decoder • Backlit keypad and LCD • Auto repeater function • Weather channel receive capability ..... **\$339<sup>95</sup>**

**New!** R-10-05 Handheld Communications Receiver Wideband coverage: 0.5 -1300MHz (cell blocked) • FM, WFM, AM, USB, LSB, CW modes • 1000 memories • 8 character alphanumeric LCD display • 7 scan modes w/priority • Cloning • More! ..... **SPECIAL \$499<sup>95</sup>**

**New!**



### IC-207H Dual Band Mobile

2M/440MHz FM • 50W/35W • Wideband receive • 182 Memory Channels • 9600 baud capability - PC ready • 50 frequency encode/decode • Backlit TTP mic • **FREE OPC-600 Separation Cable from ICOM** ..... **HOLIDAY SPECIAL \$389<sup>95</sup>**



**IC-Delta 100H Tri- Band U/V**  
2M (50W), 440 MHz (35W), 1.2 GHz (10W)  
8 Combinations of 2M, 440MHz and 1.2GHz  
transmit and Receive • 642 Memories  
Remote Control mic. **CLOSEOUT \$1249<sup>95</sup>**

### Other ICOM not Pictured

IC-2700H 50W 2M/35W 440MHz FM mobile transceiver (std. mic) .... **C/O \$449<sup>95</sup>**

IC-2700H LTD (Infrared mic) **C/O \$599<sup>95</sup>**

IC-2GXAT/HP 7W 2M HT ..... **C/O \$249<sup>95</sup>**

IC-4GXAT 440MHz FM HT ... **C/O \$269<sup>95</sup>**

R-100-11 1MHz-1.8GHz Receiver **\$799<sup>95</sup>**

PCR-1000 .5-1300MHz PC-controlled, cell-blocked ..... **\$549<sup>95</sup>**

Call to  
receive the  
**NEW**

Winter 1997/98  
AES® Catalog

### ICOM CLOSEOUTS

AT-160 Automatic antenna tuner ..... **\$ 249<sup>95</sup>**

IC-281H 2M FM, 50W, 9600b ..... **349<sup>95</sup>**

IC-706 HF/VHF Xcvr ..... **with REBATE 1099<sup>95</sup>**

IC-728 HF Transceiver ..... **999<sup>95</sup>**

IC-820H 2m/440 SSB/FM Transceiver **1099<sup>95</sup>**

IC-T41A 440MHz FM HT ..... **249<sup>95</sup>**

IC-T42A 440MHz FM HT ..... **259<sup>95</sup>**

R-1-15 .0.1MHz-1.3GHz Scan rx ..... **399<sup>95</sup>**

cell blocked

RP-1520 25W, 2M repeater ..... **2399<sup>95</sup>**

Latest New, Used & Demo Pricing is

available on our Web Page.

**ORDER TOLL FREE: 1-800-558-0411 • www.aesham.com**

# AMATEUR ELECTRONIC SUPPLY® INC.

5710 W. Good Hope Road; Milwaukee, WI 53223 • 414-358-0333 • fax: 414-358-3337 • Toll Free: 1-800-558-0411

BBS: 414-358-3472 • Internet: [www.aesham.com](http://www.aesham.com) • e-mail: [help@aesham.com](mailto:help@aesham.com)

### AES® BRANCH STORES

#### WICKLIFFE, OH

28940 Euclid Avenue  
Wickliffe, OH 44092  
440-585-7388  
1-800-321-3594  
fax: 440-585-1024

#### ORLANDO, FL

621 Commonwealth Ave.  
Orlando, FL 32803  
407-894-3238  
1-800-327-1917  
fax: 407-894-7553

#### LAS VEGAS, NV

1072 N. Rancho Drive  
Las Vegas, NV 89106  
702-647-3114  
1-800-634-6227  
fax: 702-647-3412

### STORE HOURS

Monday thru Friday

9:00 AM to 5:30 PM

Saturday

9:00 AM to 3:00 PM

OVER 40 YEARS IN  
AMATEUR RADIO!

# POWER POCKET

12V/2.0 Amp Hours of dependable power, in a convenient soft case. Simply insert the cigarette adapter plug normally used in your car's lighter to instead plug into the POWER POCKET. The POWER

POCKET provides hours of extended talk time, up to 6 times longer than standard battery packs!

- Emergencies – Special Events – Search & Rescue – Hiking – Cycling – Hamfests – Field Day – Etc.

- Compact slim design that is light weight, only 30 ozs., with a belt loop and shoulder strap included.
- 110V Wall Charger included. Charge rate: 6-8 hours from complete discharge.
- Sealed lead acid case, can be recharged to 100% without memory effect of NiCads.

*The POWER POCKET is available from most major Amateur Radio Dealers, or contact:*



**NCG COMPANY**  
1275 N. Grove Street  
Anaheim, CA 92805  
(800) 962-2611  
(714) 630-4541  
Fax (714) 630-7024

is useless!  
Don't be  
caught with-  
out a POWER  
POCKET when  
you need it  
most.



## ICOM-781 Owners!

New! High Performance SSB

• Collins Mechanical Filters, for your IC-781! • Drop in PCB Filter assembly, 2-8 Pole, 2.1 kHz, 1.4-1 SSB Filters, GaAs FET gain equalization amplifiers, and solid state switching, gold SMC RF connectors/ Ribbon cable. "Textbook" Filter performance 100 db stop band Rej. 16 Pole performance, add up to the most powerful, anti QRM system available. • Field Installable \$595. • Your IC-781 can be upgraded to MILSPEC 1030 CI spec. See our ad in Apr. QST, pg 181. Call for full color brochure.



7359 E. Softwind Dr., Scottsdale, Arizona 85255  
For Complete Specifications, Pricing and Delivery;  
Call Don Roehrs @ 602-585-4025 EMAIL signalone  
@bbcyber.com INTERNET http://bbcyber.com/signalone  
• Or call M.B. Martin & Co. @ 703-759-3976



## LOGIC 5 for Win 95

because a great hobby deserves  
state-of-the-art

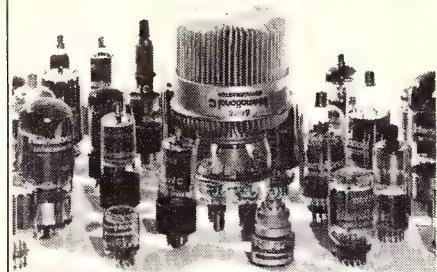
Introducing the best all around software package for your shack! New 32-bit, Windows 95/NT 4 application! Complete logging, online awards tracking for *any* award, prints QSL cards/labels, contesting, radio interfacing, antenna rotor control, digital communications for all modes, unequaled packet spotting, CW keyer, sound card support, customizable screens and reports, prints graphics and color, superb documentation, unsurpassed tech support, grayline propagation chart, interface to callbook databases, customizable for foreign languages, and much more. Free Infopak! Download the new demo from our web site today! No gimmicks, simply the best. Specs: Pentium, 12 mags RAM, CD ROM drive, Win 95 or NT 4.0, \$129. Foreign shipping extra. Visa/MC. GA residents add 7% tax. Also available: PDA QSL, Route List, SARtek rotor interface, rig and keyer interfaces, Radio Amateur Callbook.

Personal Database Applications, Dept Q, 1323 Center Dr., Auburn, GA 30011, 770-307-1511, 770-307-0760, fax 770-307-1496, tech support, e-mail: sales.qst@hosenoise.com

www.hosenoise.com

hours: 9-6 M-Th, 9-noon Fri.

CD-ROM version!



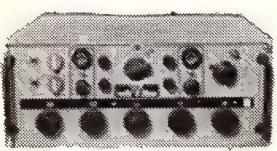
## W9GR DSP-3 Kits \$168 + \$7 S/H



As featured in the ARRL Handbook: Powerful adaptive noise filtering, automatic notching, tunable CW filters, narrow SSB/FSK/SSV filters, and even CTCSS and DTMF decoders! Includes custom cabinet.

WRITE for more info: Quantics, P.O. Box 2163, Nevada City, CA 95959  
Or see and Hear the DSP-3 on the world wide web at:  
http://www.oro.net/~w9gr/

## HF SSB RECEIVER



R-1051B  
RECEIVER,  
covers 29.9999  
MHz AM-CW-  
LSB-USB-ISB  
using six decade  
band tuning +  
vernier; 500 KHz  
IF. Meters and  
controls for LSB & USB Levels; also BFO, 600 ohm audio & 50  
ohm input impedance. Solid-state except for 3 tubes. Requires  
115 VAC 50-400 Hz; 7x17.4x18.9, 85 lbs sh.

USED-CHECKED ..... \$650 \$350  
MANUAL for R-1051B, partial repro ..... \$45

SHOCKMOUNT, new ..... \$22

R-1051G, later IC-version of above, CHECKED ..... \$295 \$625

Prices F.O.B. Lima, O. • VISA, MASTERCARD Accepted.  
Allow for Shipping • Write for latest Catalog  
Address Dept. QST • Phone 419/227-6573 • Fax 419/227-1313

**FAIR RADIO SALES**  
1016 E. EUREKA • Box 1105 • LIMA, OHIO • 45802

## T.J. ANTENNA CO./NOTT LTD.

3801-4001 LA PLATA HWY.

FARMINGTON, NM 87401

PH. 505-327-5646

FAX 505-325-1142

email: ka7w@tjantenna.com

## BROADBANDER BB3

Remotely tuned 1.8-30 MHz mobile antenna.

## BB3 BASE STATION ANTENNA

All the advantages and quality of the BB3  
plus greater height for a bigger signal.

**PARK N' TALK • ROHN • GILA-STATS**

**1-800-443-0966**

Tom/KAT7W  
Rondo/KM5HA

Ron/K5YNR  
Judy/KB5WFL

## INSURANCE

for

## AMATEURS

Insure all your radio and  
computer equipment.  
(except towers and antenna)

## HAMSURE

E Mail: hamsure@ameritech.net  
www.ameritech.net/users/hamsure/  
hamsure.html

7901 Laguna Lane, Orland Park, IL 60462

800-988-7702

Available only in 48 contiguous US

**“ALPHA amplifiers have a world-class reputation for performance and reliability and are used by many of the leading DXpeditions and serious contest entries throughout the world.”\***

**CALL US  
FOR DETAILS OF  
OUR NEW EXTENDED  
WARRANTY OFFER!**



**RIGHT: January 1994:** Powered by four **ALPHA 89** amplifiers, **3YØPI** on isolated Peter I Is. Antarctica dished out more than 60,000 QSOs despite ferocious summer blizzards and often-poor propagation.

**BELOW:** Many hundreds of DXers and contesters, including world-class operators like **CT1BOH/P4ØE**, **N6TJ/ZD8Z**, and **OH2BH/EA8BH** depend on **the ultimate linear, ALPHA 87A**.



**January 1997: VKØIR,  
Heard Island,  
South Indian Ocean**

It cost the **VKØIR** team \$200,000 *just to get to this most wanted DX country*. Propagation always is difficult here: “short path” to Tokyo is 7,500 miles, London 8,500 miles, Seattle 12,000 miles.

Operating in the shadow of 9,000 foot volcano “Big Ben”, **VKØIR** makes 80,673 QSOs – from the edge of the world at the bottom of the sunspot cycle! Their amplifiers? The same **ALPHA/POWER 91βs** that expedition organizers **KK6EK**, **KØIR** and **ON6TT** took to **XRØY** in 1995.



\* In RSGB's February 1997 *RadCom*, Peter Hart, G3SJX, provides our headline and says, “(The **ALPHA/POWER 91β**) is beautifully made... performed flawlessly...is an excellent amplifier in all respects... at a very competitive price... The **87A** really is the ultimate linear amplifier...the ‘Rolls Royce’ of all linear amplifiers.

**Visit Our Web Site  
[www.alpha-power-inc.com](http://www.alpha-power-inc.com)**



**ALPHA/POWER , Inc.**  
14440 MEAD COURT  
LONGMONT, CO 80504  
(970) 535-4173 \* FAX (970) 535-0281

**SAVE! ALPHA SUNSPOT SALE! SAVE!**

Long after sunset Saturday night, I switched on the xcvr & **ALPHA**. Before you could say “propagation,” two 9N1’s, an AP2, and a string of Siberians were in the log. Signal reports ran to S9+20 just like old times. Sunspots are back!

Dave AAØRS/G3SZA, Brad KØHM, and I all love DXing, so **ALPHA/POWER** is throwing a **SUNSPOT SALE** to celebrate long nights with 20 wide open to everywhere!

**CALL NOW** and buy a brand new **ALPHA 87A** for \$5995, an **89** for \$3795, or a **91β** for \$2695. Standard warranty and 30-day money-back guarantee, of course. Quantities are limited, so call Dave, Brad or Scott to save on **your** new **ALPHA**. Sale ends 12/19/97 in any case.

# MFJ Dual Band Mobile Antenna

For an incredible \$14.95, you get a dual band 2 Meter/440 MHz mobile antenna with strong magnet mount, stainless steel radiator, 15 feet of coax and BNC adapter for your handheld -- It's the fastest selling mobile antenna in ham radio!



MFJ-1724B

**\$14.95**

For an incredibly low \$14.95, you get an MFJ dual band 2 Meter/440 MHz mobile antenna!

It's the fastest selling mobile antenna in ham radio!

You get excellent gain for solid, noise-free QSOs. On 440 MHz, it's

a high gain 1/2 wave over 1/4 wave radiator. On 2 Meters, it's a full size 1/4 wave radiator.

Its tough stainless steel radiator is only 19 inches tall -- won't knock off when parking in your garage.

An extra powerful magnet holds it steady -- even at highway speeds.

You get 15 feet of coax with a standard PL-259 coax connector for your mobile rig.

You get a BNC adapter so you can also use it with your handheld!

Your MFJ-1724B is protected by MFJ's famous one year *No Matter What*™ unconditional guarantee.

## Dual Band 144/440 MHz Ground Plane

MFJ-1754  
**\$24.95**

New!

Dual band ground plane antenna for 2 Meters and 440 MHz gives you extra long range on 440 MHz with a high gain halfwave over quarter wave radiator. On 2 Meters you get solid quarter wave performance. Mounts on 1 to 1 1/2 inch mast with single U-bolt. Easy-to-tune.

## 1/4 Wave Ground Plane

MFJ-1740  
**\$12.95**

The MFJ-1740 brings up 2 Meter repeaters as well as any 1/4 wave ground plane made!

You get easy tuning, low loss ceramic antenna insulator and strong lightweight aluminum construction.

Single U-bolt mounting for 1 to 1 1/2 inch mast. Cutting chart included for 220/440 MHz. Made in USA.

## MFJ Pocket Roll-Up™

2 Meter halfwave J-pole antenna

MFJ-1730  
**\$14.95**

Roll up this halfwave 2M J-pole antenna and stick it in your pocket! It's the perfect gain antenna for traveling.

Get home station performance on the go. Just hang your MFJ Pocket Roll-Up™ in the clear and plug the BNC connector into your handheld.

It's omni-directional and has significant gain over a 1/4 wave. It does not need a cumbersome ground plane so it's convenient for indoors and works great with handhelds. Made in USA

## Dual Band flexible Ducks

144/440 MHz flexible ducks for HTs

A. *High Gain FlexiDuck™*

MFJ-1717, \$19.95. Enjoy dependable QSOs when other rubber ducks give you noise. High gain 1/2 wave on 440 MHz, full size 1/4 wave on 2M. Won't jab you -- bends, twists, flexes with you. 15 3/4 inches.

B. *FlexiDuck™*, MFJ-1716, A. B.

\$16.95. Similar to MFJ-1717. Full 1/4 wave on 440 MHz, efficient loaded 1/4 wave on 2 Meters. 8 3/4 inches.

## Shorty Duck™ for HTs

Add this short, 4 1/4" MFJ-1718 inch *ShortyDuck™* to your \$12.95 2M handheld for a Q-5 signal! Impedance matched for maximum gain. High-Q helical wound radiator.



MFJ-1728B

**\$24.95**

For maximum range while mobile, use MFJ's **Maximum Gain™** 5/8 Wave 2 Meter Mobile Antenna. You'll get the maximum possible gain of any single element mobile antenna!

Competitive 5/8 wave mobile antennas can't work any better -- no matter how much more they cost.

You get low SWR so your rig can safely deliver maximum power into your antenna. It's rated at 300 watts PEP so you can use any mobile rig plus a mobile amplifier.

You get a heavy-duty magnet mount that holds your antenna tight at highway speeds and a black magnet base that'll look good for years.

You get a stainless steel radiator that'll endure years of harsh mobile use and 12 feet of coax cable.

You get MFJ's one year *No Matter What*™ unconditional guarantee.

Order MFJ-1728B with standard PL-259 coax connector and also includes a free BNC adapter for your handheld.



## Glass Mount Dual Band 144/440 MHz

MFJ-1734

**\$39.95**

New!

The MFJ-1734 is the best glass mount dual band 144/440 MHz antenna in ham radio!

It's perfect for your dual band mobile. A free BNC adapter is included for your handheld.

You'll get a potent gain on 2 Meters and a thundering 440 MHz with low SWR. It handles 50 watts of power and includes 12 feet of coax, cleaning pad, and all mounting hardware.

A small 6 inch counterpoise mounted inside your vehicle lowers SWR and makes tuning easy. Tuning tool included.

A unique radiator mount lets you adjust the outside radiator for angled surfaces -- no tool needed. The radiator is easily removable to prevent damage to your antenna when you wash your vehicle.

It's easy to install on a glass window or other non-conductive surface.

MFJ-1738, \$29.95, for 2 Meter, less counterpoise.

MFJ-94, \$7.95, remounting kit for MFJ-1734 and MFJ-1738.

**MFJ dual band 144/440 MHz Yagi**

7 elements on 440 MHz... 4 elements on 2 Meters... \$69.95

Get two Yagis for the price of one... put two Yagis in the space of one with single coax feed!

Gets 7 elements on 440 MHz and 4 New!

elements on 2 Meters.

MFJ's exclusive dual band balanced feed with *FerriteChoke™* decoupling prevents pattern skewing and gives you low SWR. 1/4 inch diameter driver elements give wide bandwidth.

This National Bureau of Standards design is optimized for maximum gain, high front-to-back ratio and clean symmetrical pattern.

Mounts vertically for FM/Packet or horizontally for SSB with single included U-bolt on 1 to 1 1/2 inch mast or tower leg.

High strength 6061-T6 aluminum 5 foot, 1 1/8 inch diameter boom. 2 bands. Elements are electrically isolated from boom. Made in USA.

## Portable 3 element Yagi for 2 M

MFJ-1763 You can set up or take down MFJ's

**\$39.95** portable 3 elements 2 Meter Yagi in seconds! Elements simply screw into the boom.

You can take it with you wherever you go and have the "oomph" and directivity of a beam.

It's easy to store and sturdy enough to use as your home station antenna.

Mounts vertically for FM/packet or horizontally for SSB. Center or end mounts with single U-bolt. Great for packet/PacketCluster™.

It's compact 2 1/4 foot boom gives you a calculated gain within 1 dB of a four element Yagi with a boom nearly twice as long.

Extra thick elements maintain high gain and directivity over entire 2 Meter band. MFJ's *FerriteChoke™* decouples feedline.

Elements and boom are made from strong lightweight aluminum and protected by MFJ's *Permanent Molecular Bonding Technology™*.

Weighs just 2 pounds. Boom is 30 1/2 inches. Made in USA.



## 5/8 Wave Ground Plane

MFJ-1750  
**\$19.95**

For a low, low

\$19.95, you get a high

performance 2 Meter

5/8 wave ground

plane home station

antenna -- you'll get the maximum gain of any single element antenna.

More expensive 5/8 wave ground planes can't work any better -- no matter how much they cost.

You get... shunt fed matching that bleeds off unwanted static and gives you low SWR... strong lightweight aluminum construction... low loss ceramic antenna insulator... MFJ's *RapidTune™* radiator... MFJ's one year *No Matter What*™ guarantee. It mounts on 1 to 1 1/2 inch mast with single U-bolt and is Made in USA.

**MFJ-1752**, \$19.95, for 220 MHz.

## HT Range Extenders

*Telescoping antennas for handhelds*

A. *Long Ranger™* 2 Meter Halfwave, MFJ-1714, \$16.95. For really long range this MFJ endfed halfwave is hard to beat. It outperforms a 5/8 wave on a handheld because the 5/8 wave needs a ground plane. The MFJ halfwave doesn't. It's shorter, lighter, has more gain and places less stress on your antenna connector than a 5/8 wave antenna. When collapsed, it performs like a rubber duck. 40" extended, 10 1/2" collapsed.

B. *Dual Bander™* for 2 Meters and 440 MHz, MFJ-1712, \$14.95. Got a new dual band handheld or separate units? One antenna fits all. It's a 1/4 wave for 2 Meters and a 5/8 wave with gain for 440 MHz. 7 1/4" collapsed, 19" extended.

C. *Pocket Linear™* 5/8 Wave, 2 Meters, MFJ-1710, \$9.95. Carry this pen size antenna in your pocket like a ballpoint pen. When you're using your rubber duck, on the fringe and noisy, put on the *Pocket Linear™*, extend it to 24 1/2" and carry on your QSO. Has pocket clip. 5 1/4" collapsed.

## 144/440 MHz Duplexer

Lets you use MFJ-916 dual band 144/440 MHz antenna with separate transceivers or separate 144/440 MHz antennas with dual band transceiver.

**Nearest Dealer/Orders: 800-647-1800**

**Technical Help: 800-647-TECH (8324)**

• 1 year *unconditional* guarantee • 30 day money back guarantee (less s/h) on orders from MFJ. **Free catalog**

**MFJ ENTERPRISES, INC.**

Box 494, Miss. State, MS 39762  
(601) 323-5869; 8-4:30 CST, Mon-Fri

**FAX:** (601) 323-6551; Add s/h

**MFJ . . . making quality affordable**

Prices and specifications subject to change © 1995 MFJ Enterprises Inc.

# WHO SAYS YOU CAN'T IMPROVE A MASTERPIECE

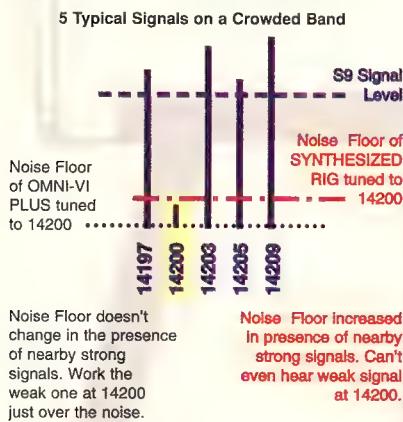
Like a great artist who steps back, reflects, then adds a final brush stroke, we hams at TEN-TEC could not resist a few subtle but powerful refinements to our treasured OMNI-VI. Take a look at this new "OMNI-VI PLUS", and judge for yourself how we improved a masterpiece....

## JUST THE RIGHT AMOUNT OF DSP...

...to forget about those add-on DSP boxes. New, single button NOISE REDUCTION improves signal-to-noise on the weakest signals - makes SSB and CW leap out of the noise. DSP LOW PASS is now available in all modes providing 5 choices to cut the highs "just the way you want" to reduce listening fatigue. Rig even remembers your separate choices for SSB and CW. The DSP processor adds two more subtle features to the canvas. Built-in AUTO NOTCH instantly eliminates interfering carriers - now work 40 meters day or night. Finally, CW transmit offset is adjustable 400 - 990 Hz with auto tracking sidetone.

## WORK STATIONS OTHER RIGS CAN'T EVEN HEAR

Let's compare OMNI to any competitor's synthesized rig with both tuned to the same frequency.



Phase noise generated *inside* the competitor's rig causes the noise floor to *temporarily* increase, covering weak signals *inside* your passband, especially when strong signals *outside* your passband are within a few KHz of where you'd like to listen. No other transceiver comes close. With this masterpiece in your shack, you'll work stations missed by others.

We offer 3 ways to upgrade: Option 1 - \$75.00 Option 2 - \$125.00 Option 3 - \$275.00  
Contact factory for copy of detailed upgrade package.



## SUPERB SELECTIVITY

The artist is never quite satisfied....We've added one more optional filter position. Provides up to 4 choices of bandwidth in the 6.3 MHz I-F and now 3 choices in the 9 MHz I-F. Two of the 7 filters are standard; add only the options that fit your "view" of the bands. In the OMNI tradition, all filters remain independent of mode.

## ATTENTION TO THE DETAILS

Rigorous computer controlled tests now exercise every OMNI. Made possible by the rig's high speed PC Interface coupled to automatic test equipment. Our own custom software orchestrates the entire process. There's also an overnight burn-in. OMNIs transmit into dummy loads cycling between RX and TX

every few seconds changing bands along the way. One final performance check finishes things up. A reliable masterpiece out of the box and for years to come.

## THE FINISHING TOUCHES

Silky smooth, lightening fast QSK, iambic keyer, front panel layout meant to use not just admire, revised menu system for quicker access, adjustable display intensity, adjust main tuning knob for the feel *you* like, band stacking registers, 100% duty cycle final so rugged it doesn't require SWR foldback, one-year warranty backed by the legendary TEN-TEC service...all the traits of a masterpiece.

**\$2585**

plus shipping and handling

- No-Risk 30-day Money-Back Guarantee\*\*
- We take trades on used TEN-TEC gear.
- We accept VISA, Mastercard, and Discover
- Visit our home page at [www.tentec.com](http://www.tentec.com)

\*\*Customer pays shipping both ways.

**CALL TODAY**

**1-800-833-7373**

Monday - Friday

9:00 a.m. - 5:30 p.m. EST

You can reach us at:

1185 Dolly Parton Parkway  
Sevierville, TN 37862  
Office: (423) 453-7172  
FAX: (423) 428-4483  
e-mail: [sales@tentec.com](mailto:sales@tentec.com)  
Repair Dept: (423) 428-0364 (8a - 4p EST)



# Big Holiday Savings! Hot New Deals!

KANTRONICS • LARSEN • VAN GORDEN • DAIWA • W5YI BOOKS • AMERITRON • MIRAGE

**ICOM**  
Handhelds  
IC-T2A 2M 4.5W  
Enc & Dec. 1 Price Slashed \$25  
IC-T7HP Dual Band  
Now High Power! Under \$275  
IC-W32A Dual Band 5W  
True Dual Rx! Under \$329  
  
2M Mobiles  
IC-2000H 50W  
Price Reduced! Under \$255  
Dual Band Mobiles  
IC-207H  
Free Remote Cable!  
Remote Head! Under \$389  
IC-2710H  
Free Remote Cable!  
True Dual Band Rx!  
Remote Head! Under \$499  
HF Transceivers  
IC-706 MKII • IC-756  
IC-R10, Reduced \$36

**YAESU**  
Handhelds  
VX-1R  
New Petite Dual Band Under \$285  
FT-50RDH Dual Band 5W  
\$20 Coupon! Enhanced Keyboard  
2W FNB-49 Battery \$9.95  
with Radio Purchase  
FT-11RH 5W  
Premium 2M HT!  
2M Mobiles  
FT-2500H 50W  
\$30 Coupon • Under \$295  
Dual Band Mobiles  
FT-8100H  
Remote Head! \$35 Coupon  
HF Transceivers  
FT-840 • FT-900CAT  
FT-1000MP Low Price!  
FT-920 \$100 Coupon  
HF • Under \$1650 • Limited Supply!

**KENWOOD**  
Handhelds  
TH-79ADH 5W  
Dual Band Tx & Rx  
\$329 Limited Supply!  
New TH-371A  
2M Mobiles  
TM-261A  
Backlit Mic! \$20 Coupon  
Under \$249  
  
**HD**  
AT-600HP 5 Watts  
Dual Band HT  
\$30 Coupon  
Now Under  
\$289  
AR-146 2M Mobile  
Tone Encode & Decode  
Highly Rated QST  
Under \$229

**ALINCO**  
DX-70TH  
HF + 6M  
Great Mobile HF Rig!  
DR-140TQ  
Tone Encode &  
Tone Decode  
DR-605T  
Great Dual Band!  
Call Now!  
1-800-423-2604

Call **1-800-423-2604** Now!  
**Austin Amateur Radio Supply**

5325 North I-35 • Austin, Texas 78723

Tech & Info 512-454-2994 • Fax 512-454-3069

Prices and promotions subject to change without notice.

**Spider Antenna**  
TM  
P/N 10-11 • P/N 0396 • Made in U.S.A.

Go with the original **NO-HASSLE, NO-TAP, NO-WHIP** Adjustment  
Multiple Band Antenna!

Wherever you roam, on Land or Sea . . . or even at Home

**On Land**  
Suitable for use on any motor vehicle from a compact automobile to a motor home or trailer. Work four bands without stopping to change resonators.

**Or Sea**  
The Spider™ Mariner is for use on or near the ocean. Highly polished stainless steel and nickel-chrome plated brass. Commercial marine frequencies (8, 12, 16 and 22 MHz) are also available.

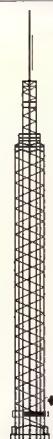
**At Home**  
If you live in an apartment, condominium or restricted area, the Spider™ may well be the answer to your antenna problems.

**MULTI-BAND ANTENNAS**  
7131 OWENSMOUTH AVENUE, SUITE 363C  
CANOGA PARK, CALIFORNIA 91303  
TELEPHONE (818) 341 5460

**WE DON'T BUILD THE MOST, WE JUST BUILD THE BEST!**

- Our LM-470D is now redesigned to hold 15 ft. of antennae at 70 mph!
- Tri-Ex builds the finest in crank-up, free-standing or guyed towers.
- All towers are complete with rigid concrete base mount.

CALL FOR DISCOUNTS  
ON SELECTED MODELS!



**tri-Ex**  
TOWER CORPORATION  
7182 Rasmussen Ave. • Visalia, CA 93291



Where engineering  
and quality  
come first

TO ORDER CALL  
800-328-2393

FAX  
209-651-5157



Antique Radio  
on CD-Rom's!

Now 11 CD's and  
growing!

**The Radiophile Series** - a CD series covering antique radio troubleshooting, reference and general interest info. 5 Volumes now available- old books, schematics, "how to", repair data, schematics & more! Only \$85.00 each

#### "Rider Troubleshooters Manual"

The **only** database driven 6-volume CD series with over 50 manufacturers radios not even listed in the Riders index! Fast - absolutely accurate index, multilevel searching, took 2 years to index page by page for accuracy! The most comprehensive reference available on old radios. VI-4, 5-8, 9-12, 13-16, 17-20 and 20-23! Hundreds sold and used daily. Only \$ 85 per 4-volume set or \$ 450 for complete 6-CD set of 23 Rider volumes.

Visit us at <http://www.electrosys.com>

#### New Schematic Diagram Service!

Snail Mail or EMail! Antique Radios,  
Ham Equipment, Communication  
Receivers - Complete Manuals or  
Just Schematics - Ck our listings!

#### Radio Era Archives

2043 Empire Central Dallas, Texas 75235  
(214) 358-5195 Fax (214) 357-4693  
We take all major credit cards

# MAXIMUM FUN MINIMUM INVESTMENT

Kit is dedicated to putting the fun back into building. We pledge to design kits from the ground up to be built by average hams with simple test equipment. And best of all, kit building saves you money.

## 2 METER FM TRANSCEIVER

Building a sophisticated microprocessor-controlled rig is easy with our step-by-step assembly manual. You build in sections and then make progress tests along the way. Added benefit is the knowledge to maintain it yourself for years to come. The only essential test equipment is a VOM.

Encoder tunes 143.5 - 148.5 in 5

KHz steps (or 2.5 kHz)

15 memories store repeater offset and subaudible tones

Stores non-standard split (CAP, MARS)

Built-in subaudible tone encoder

Instantaneous PIN diode T/R switching

Packet-ready with rear panel DIN connector (1200 baud)

Large LED readout

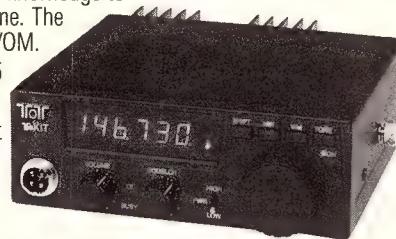
Build it now 5 or 30 watts, or upgrade to 30 watts later

Complete enclosure, mike, and mobile bracket included

2.25" H x 6.5" W x 6.75" D or 7.75" D for 30 watts

220.....5 watts out.....\$195\*

222.....30 watt module.....\$64\*



## 6 METER FM TRANSCEIVER

Same features as 2 meter model. Covers 50.095 - 54.1 MHz.

260.....5 watts out.....\$195\*

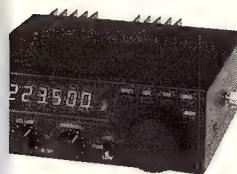
Sorry, FCC rules forbid sales of add-on power amp)



## 222 MHz FM TRANSCEIVER

Same features as 2 and 6 meter models. Covers 222 - 225 MHz in 10 kHz steps. 4 watts out on low power, 20 watts out on high.

1230.....\$295\*



## EXPLORE 6 METERS FOR ONLY \$95

Need to buy a complete transceiver to discover the fun of 6 meters. T-Kit offers two transverters to choose from. **Model 1209** converts your 2 meter handheld or mobile rig to 6.

Features and modes on your 2 meter rig immediately available on 6 M SSB/CW). Tune 144 - 148 MHz

work 50 - 54 MHz. **Model 1208**

converts any modern HF rig with

0 meters to 6. Tune 14 - 16 MHz to work 50 - 52 MHz.

5 watts max input delivers 8 watts out

Silent RF-sense PIN diode T/R switching

Only 1.3" H x 7.25" W x 6.125" D

Simple hookup, no mods needed to most rigs

208.....20 to 6 meter, kit.....\$ 95\*

208A.....20 to 6 meter, factory assembled.....\$159\*

209.....2 to 6 meter, kit.....\$ 95\*

209A.....2 to 6 meter, factory assembled.....\$159\*



## 2 METERS, ALL MODES, \$139

Add 2 meter, all mode capability to any HF transceiver for only \$139. Four to 20 watts input on 10 meters from your HF rig produces 10 watts output on 2M. All features and modes on your HF rig immediately available on 2M. Work 2M SSB/CW DX, amateur satellites, or FM! Tune 28 - 30 MHz for 144 - 148 MHz coverage.

1210, kit.....\$139\*

1210A, factory assembled.....TBA\*



## QRP CW TRANSCEIVERS

Ten-Tec's long tradition of offering quality rigs for QRP enthusiasts continues with these single band CW transceiver kits. Features 3W RF output, QSK CW, sensitive single conversion receiver with built-in 4-pole crystal filter and RIT. Measures 2.75" H x 6" W x 6" D. Draws 35 - 80 ma on receive, 800 ma on transmit from 13.8 VDC source. Available for 20, 30, or 40 meters.

1320, 1330, 1340.....\$95\*

Coming Soon - 80 meters!



## DUAL BAND SWR/RF WATTMETER

Connectors for both HF and VHF let you leave meter in line with BOTH rigs. Front panel switch between HF and 2 meters. Measure power or SWR on 20 or 200 watt ranges.

1.8 - 30 MHz and 144 - 148 MHz.

1202, kit.....\$49\*

1202A, factory assembled.....\$74\*



## PORTABLE SWL RECEIVER

Enjoy quality shortwave listening comparable to factory built portables. Listen to local and international AM broadcast as well as SSB/CW from around the world.

- Covers 100 kHz - 30 MHz
- 2.5 kHz and 100 kHz tuning steps with clarifier
- 15 programmable memories
- Dual conversion, superheterodyne
- 13.8 VDC operation; AC wall transformer included
- 2.25" H x 6.5" W x 6.5" D

1254.....\$195\*

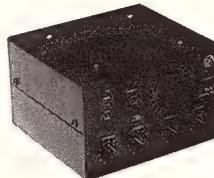


## 9-BAND SWL RECEIVER

Modernized "first radio kit" classic. Five transistor, 3 IC design, electronic bandswitch. Tune both AM broadcast and SSB/CW from 1.8 - 22 MHz. Has Main and Fine tuning, Regen, RF gain, Volume.

Powerful audio to built-in speaker, your own speaker or stereo phones. Use 8 C cells or ext. 12 VDC.

1253.....\$59\*



## CALL 1-423-453-7172 TODAY

to request a free catalog. Includes these kits and more budget priced projects for hams and SWLs. Ask about club kit building discounts!

Orders only (800) 833-7373

FAX: (423) 428-4483

E-Mail: sales@tentec.com

9:00 a.m. - 5:30 p.m. EST

Monday - Friday

...America's Best!



or write us at: T-Kit  
a division of TEN-TEC, Inc.  
1185 Dolly Parton Pkwy.  
Sevierville, TN 37862

Visit our web site at <http://www.tentec.com>

\*Plus shipping & handling



© Copyright 1997

# Time-travel through the decades with back issues of **QST** on CD!

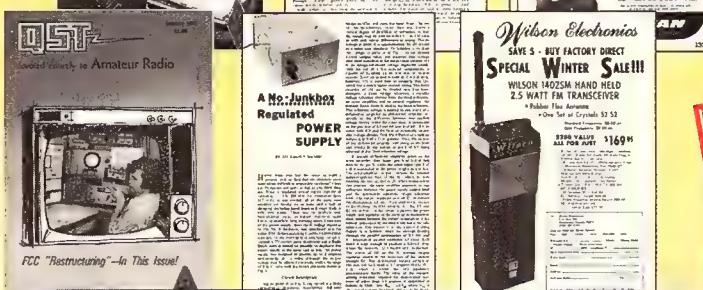
**50s...**



**60s...**



**70s...**



**80s...**



## ...into the 90s

Each page—all the ads, articles, columns and covers—scanned to provide a black-and-white image that can be read on your computer screen or printed. Easy-to-use software included on the CD allows you to:

- search for articles by title and author
- select specific year and issue, and
- browse individual articles or columns
- Microsoft Windows required



**ARRL**

fax: 860-594-0303

#### Standard Shipping Charges:

\$4 for 1st item ordered plus \$1 for each additional item. Non-US addresses add \$1.50. US orders shipped by UPS.

Connecticut residents add 6% state sales tax.



**QST View CD-ROM**

<b>1950-59</b>	Order No. 6435	<b>\$39.95</b>	<b>NEW!</b>
<b>1960-64</b>	Order No. 6443	<b>\$39.95</b>	<b>NEW!</b>
<b>1965-69</b>	Order No. 6451	<b>\$39.95</b>	<b>NEW!</b>
<b>1970-74</b>	Order No. 5781	<b>\$39.95</b>	
<b>1975-79</b>	Order No. 5773	<b>\$39.95</b>	
<b>1980-84</b>	Order No. 5765	<b>\$39.95</b>	
<b>1985-89</b>	Order No. 5757	<b>\$39.95</b>	
<b>1990-94</b>	Order No. 5749	<b>\$39.95</b>	

Each set of CDs has an index to aid in finding the page or section of the issue you want to view or print.

Call our toll-free number

**1-888-277-5289** today.

8 AM - 8PM Eastern time

We'll be happy to take your order or provide you with the location of an ARRL Publications Dealer in your area.

225 Main Street • Newington, CT 06111-1494 tel: 860-594-0250  
e-mail: [pubsales@arrl.org](mailto:pubsales@arrl.org) World Wide Web: <http://www.arrl.org/>

# Bearcat Intercepts Trunked Radio

**C** COMMUNICATIONS  
ELECTRONICS INC.

## New...Bearcat Trunktracking radios

Get your Bearcat 235XLT for only \$199.95 or Bearcat 895XLT for only \$239.95 when you order our package deal. To get your free fax-on-demand catalog, call 313-663-8888 from the telephone handset on your fax machine and follow the recorded voice prompts. Get many free benefits such as extended warranty coverage on new Bearcat scanners when you use your Communications Electronics Platinum Plus Master Card® issued by MBNA. No annual fee. Call 1-800-523-7666 anytime and mention offer Q3K1 to request yours today.

Get your Bearcat 895XLT for only \$239.95 when you order package deal #UN18PD. Our package deal includes mobile mounting bracket #MB001 \$14.95; Cigarette lighter power cord #PS001 \$14.95; external speaker #EX711 \$19.95 and mag-mount mobile antenna with 12 foot cable #ANTMMBNC \$29.95; plus \$29.00 shipping. Total package deal price is \$348.75. Hurry offer expires 1/31/98.

## Bearcat® 895XLT-A Radio Scanner

Mfg. suggested list price \$729.95/Special \$319.95  
300 Channels • 10 banks • Built-in CTCSS • S Meter  
Size: 10-1/2" Wide x 7-1/2" Deep x 3-3/8" High  
Frequency Coverage: 29.000-54.000 MHz., 108.000-174 MHz., 216.000-512.000 MHz., 806.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

The Bearcat 895XLT is superb for intercepting trunked communications transmissions (see BC235XLT description) with features like TurboScan™ to search VHF channels at 100 steps per second. This base and mobile scanner is also ideal for intelligence professionals because it has a Signal Strength Meter, RS232C Port to allow computer-control of your scanner via optional hardware and 30 trunking channel indicator annunciators to show you real-time trunking activity for an entire trunking system. Other features include **Auto Store**—Automatically stores all active frequencies within the specified bank(s). **Auto Recording**—This feature lets you record channel activity from the scanner onto a tape recorder. **CTCSS Tone Board** (Continuous Tone Control Squelch System) which allows the squelch to be broken during scanning only when a correct CTCSS tone is received. For maximum scanning enjoyment, order the following optional accessories: **PS001** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; **PS002** DC power cord—enables permanent operation from your vehicle's fuse box \$14.95; **MB001** Mobile mounting bracket \$14.95; **EX711** External speaker with mounting bracket & 10 feet of cable with plug attached \$19.95. The BC895XLT comes with AC adapter, telescopic antenna, owner's manual and one year limited Uniden warranty. Save \$80.00...order the package deal above.

## Bearcat® 3000XLT-A Radio Scanner

Mfg. suggested list price \$699.95/Special \$329.95  
FREE - Get an extra BP2500 battery pack, a \$51.95 value when you order a Bearcat 3000XLT. Hurry...offer expires 1/31/98.  
400 Channels • 20 banks • Twin Turbo Search/Scan  
Frequency Transfer • VFO Control • Automatic Store

10 Priority Channels • Selectable Mode • Data Skip

Frequency step resolution 5, 12.5 & 25 kHz.

Size: 2-3/4" Wide x 1-1/2" Deep x 7-3/8" High

Frequency Coverage:

25.000-54.995 MHz., 760.000-823.995 MHz., 849.0125-868.995 MHz., 894.0125-1,300.000 MHz.

The Bearcat 3000XLT is the ideal handheld radio scanner for communications professionals. This handheld scanner scans at 100 channels per second and searches at a rate up to 300 steps per second. A selectable attenuator eliminates annoying intermodulation from adjacent frequencies in highly populated areas. Selectable AM, Wide FM and Narrow FM modes allow you to change the default receiving mode of the BC3000XLT. For maximum scanning pleasure, order the following optional accessories: **U502** Cigarette lighter power cord for temporary operation from your vehicle's cigarette lighter \$14.95; **LC3000** Deluxe swivel leather carrying case \$49.95; **BP2500** rechargeable nickel-cadmium battery pack for up to five hours of dependable use \$39.95; **ANTMMBNC** Magnetic mount scanner antenna with BNC jack and 12 feet of cable \$29.95. **ANTSGBNC** Glass mount scanner antenna with BNC cable \$29.95. The BC3000XLT comes with AC adapter, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. Order today.

## TrunkTracking Radio

Get your Bearcat 235XLT for only \$199.95 when you order package deal #UN12PD. Our package deal includes deluxe swivel belt loop leather carrying case #LC235 \$49.95; Cigarette lighter power cord #U502 \$14.95; and mag-mount mobile antenna with 12 feet cable #ANTMMBNC \$29.95; plus \$29.00 shipping. Total package deal price is \$323.80. Hurry offer expires 1/31/98.

## Bearcat® 235XLT-A TrunkTracker

Mfg. suggested list price \$429.95/CEI price \$269.95  
300 Channels • 10 banks • Trunk Scan and Scan Lists  
Trunk Lockout • Trunk Delay • Extra battery & charger  
10 Priority Channels • Programmed Service Search  
Size: 2-1/2" Wide x 1-3/4" Deep x 6" High

Frequency Coverage:

29.000-54.000 MHz., 108-174 MHz., 406-512 MHz., 806-823.995 MHz., 849.0125-868.995 MHz., 894.0125-956.000 MHz.

The Bearcat TrunkTracker BC235XLT, is the world's first scanner capable of tracking a selected radio transmission as it moves across a trunked radio system. Now it's easy to monitor fleets and subfleets in analog trunked radio systems. The BC235XLT can also work as a conventional scanner. This 300-channel, programmable handheld scanner provides scanner users with uninterrupted monitoring capabilities of Type I, II, III and hybrid trunking systems. One of the biggest obstacles in the scanner industry has been the increasing use of trunking radio systems in business and public service agencies throughout the United States and Canada. This makes it nearly impossible to track a conversation as it moves within a trunk system from frequency to frequency. According to Ken Ascher, WB8LIT, Chairman & CEO of Communications Electronics, "The Bearcat 235XLT is a revolutionary breakthrough in scanner technology. Now it's easy to continuously monitor conversations even though the message is switching frequencies." The BC235XLT comes with AC adapter, CRX120 battery charger, two rechargeable long life ni-cad battery packs, belt clip, flexible rubber antenna, earphone, owner's manual and one year limited Uniden warranty. Not compatible with AGEIS, ASTRO, EDACS, ESAS and LTR systems. Call 1-800-USA-SCAN to order your scanner now.

## VHF/GMRS/CB Radios

Have fun and use our CB, GMRS and commercial radios to keep in touch with friends. For even bigger savings, *QST Magazine* readers use the coupon on this page.

Cobra 148FGLT-A SSB CB with frequency counter ..... \$179.95  
Cobra 29WXST-A CB with sound tracker technology ..... \$149.95  
Cobra 29LTDWX-A CB with weather alert ..... \$109.95  
Cobra 25WXST-A CB with sound tracker technology ..... \$129.95  
Cobra 2010GTLWX-A SSB CB Base (\$25.00 shipping) ..... \$299.95  
Cobra HH45WX-A Handheld CB radio with weather ..... \$89.95  
Maxon GMRS210+3-A GMRS transceiver/SPECIAL ..... \$166.95  
RELM RH256NB-A 25 watt VHF mobile transceiver ..... \$284.95  
RELM MPV32-A 5 watt VHF handheld transceiver ..... \$299.95  
Uniden GRANTXL-A SSB CB Mobile ..... \$124.95  
Uniden PRO538W-A CB & Weather ..... \$54.95

## Save up to \$995.00

It pays to be a *QST* magazine reader. Order any scanner or transceiver from CEL. Send or fax this coupon with your order and save. Call 1-800-USA-SCAN to order.

VR204DAT8 8 channel digital audio logger ..... \$750.00  
HS100 RELM 100 channel handheld scanner ..... \$15.00  
HS200 RELM 200 channel scanner with CTSS/DCS ..... \$55.00  
LC3000 Leather carrying case for BC3000XLT ..... \$10.00  
LC235 Leather carrying case for BC235XLT, SC150 ..... \$20.00  
29WXST Cobra CB with sound tracker technology ..... \$15.00  
LCMP RELM swivel deluxe leather carrying case ..... \$20.00  
BCMP RELM rapid charge ni-cad battery charger ..... \$10.00  
SMMP RELM speaker/mic for WHS MP radio ..... \$10.00  
BC007 RELM extra ni-cad battery pack ..... \$10.00  
BC002 Bearcat CTCSST tone board ..... \$20.00  
BC003 Bearcat switch assembly for BC002 ..... \$10.00  
BC005 Bearcat CTCSST tone board ..... \$20.00  
EX711 Bearcat scanner external speaker ..... \$10.00  
ANTSGBNC glass mount antenna with BNC ..... \$10.00  
ANTMMBNC magnetic mount antenna with BNC ..... \$10.00  
Offer valid only on prepaid orders mailed to Communications Electronics Inc., PO Box 1045, Ann Arbor MI 48106 USA. Offer valid November 20, 1997 to January 31, 1998. Limit one coupon per item. Coupon is not redeemable with any other coupon or any other offer. Mention offer number AQ.

## Bearcat Scanners

Monitor fire, police, weather, marine, medical, aircraft and other transmissions with your Bearcat scanner.

Bearcat 9000XLT-A base/mobile ..... \$344.95  
Bearcat 3000XLT-A handheld ..... \$329.95  
Bearcat 895XLT-A TrunkTracker base ..... \$319.95  
Bearcat 860XLT-A 100 channel base ..... \$149.95  
Bearcat 760XLT-A base/mobile ..... \$179.95  
Bearcat 230XLT-A handheld/SPECIAL ..... \$194.95  
Bearcat 235XLT-A TrunkTracker scanner ..... \$269.95  
Bearcat 178XLT-A base with weather alert ..... \$99.95  
Sportcat 150-A handheld with 800 MHz. ..... \$144.95  
Bearcat 80XLT-A handheld with 800 MHz. .... \$129.95  
Bearcat BCT7-A information mobile ..... \$149.95  
Bearcat BCT12-A information mobile ..... \$169.95  
RELM HS200-A handheld CTCSS/800 MHz. .... \$224.95  
RELM HS100-A handheld 100 channel ..... \$129.95

## NEW/RELM®MPV32-A Transceiver

Mfg. suggested list price \$515.00/Special \$299.95

Looking for a great hand-held two-way transceiver? Ham radio operators depend on the RELM MPV32 transceiver for direct two-way

communications with their fire or police department, civil defense agency or ham radio repeater. The MPV32 is our most popular programmable frequency agile five watt, 32 or optional 64 channel handheld transceiver that has built-in CTCSS, which may be programmed for any 39 standard EIA tones. Frequency range 136.000 to 174.000 MHz. The full function, DTMF compatible keypad also allows for DTMF Encode/Decode and programmable ANI. Weighing only 15.5 oz., it features dealer programmable synthesized frequencies either simplex or half duplex in 2.5 KHz. increments. Other features include PC programming and cloning capabilities, scan list, priority channel, selectable scan delay, selectable 5 watt/1 watt power levels, liquid crystal display, time-out timer and

much more. When you order the MPV32 from CEI, you'll get a complete package deal including antenna, 700 mA battery (add \$20.00 to substitute a 1000 mA battery), battery charger, belt clip and user operating instructions. Other useful accessories are available. A heavy duty leather carrying case with swivel belt loop part #LCMP is \$49.95; rapid charge battery charger, part #BCMP is \$69.95; speaker/microphone, part #SMMP is \$54.95; extra high capacity 1000 mA ni-cad battery pack, part #BPM1 is \$79.95; extra 700 mA ni-cad battery pack, part #BPM7 is \$59.95; 64 channel option, order #64MP is \$79.95; cloning cable part #CCMP is \$19.95; PC programming kit, part #PCKIT030 is \$224.95. A UHF version with a frequency range of 450-480 MHz. part #MPU32 is \$349.95. The radio technician maintaining your radio system should order dealer programming instructions part #PIMPV for \$18.00 to activate this radio.

## Buy with confidence

It's easy to order from us. **Mail orders to:** Communications Electronics Inc., P.O. Box 1045, Ann Arbor, Michigan 48106 USA. Add \$17.00 per weather station or radio product for UPS ground shipping, handling and insurance to the continental USA unless otherwise stated. Add \$12.00 shipping for all accessories and publications. Add \$12.00 shipping per antenna. For Canada, Puerto Rico, Hawaii, Alaska, Guam, P.O. Box or APO/FPO delivery, shipping charges are two times continental US rates. Michigan residents add state sales tax. No COD's. Satisfaction guaranteed or return item in unused condition in original packaging within 61 days for refund, less shipping charges. 10% surcharge for net 10 billing to qualified accounts. All sales are subject to availability, acceptance and verification. Prices, terms and specifications are subject to change without notice. We welcome your Discover, Visa, American Express or MasterCard. Call anytime 1-800-USA-SCAN or 800-872-7226 to order toll-free. Call 313-996-8888 if outside Canada or the USA. FAX anytime, dial 313-663-8888. Dealer and international inquiries invited. Order from Communications Electronics Inc. today.

Price schedule effective November 20, 1997 AD #112097QST © 1997 Communications Electronics Inc.

**For credit card orders call  
1-800-USA-SCAN**  
**Communications Electronics Inc.**  
**Emergency Operations Center**

PO Box 1045, Ann Arbor, Michigan 48106-1045 USA  
For information call 313-996-8888 or FAX 313-663-8888

# BEST WISHES

for this Christmas season,  
and the coming year!

from the makers of the **HEX-BEAM™**



MINIATURIZED CONTROLLED FIELD ANTENNAS

**Traffic Technology**

421 JONES HILL ROAD ASHBY, MA 01431-1801  
978-386-7900 Phone/Fax 1-888-599-BEAM Toll Free USA



1) Advertising must pertain to products and services which are related to Amateur Radio.

2) The Ham-Ad rate for commercial firms offering products or services for sale is \$1.00 per word. Individuals selling or buying personal equipment: ARRL member \$0.60 per word. Non-ARRL member \$1 per word. **Bolding** is available for \$1.50 a word.

3) Remittance in full must accompany copy since Ham-Ads are not carried on our books. Each word, abbreviation, model number, and group of numbers counts as one word. Entire telephone numbers count as one word. No charge for postal Zip code. No cash or contract discounts or agency commission will be allowed. Tear sheets or proofs of Ham Ads cannot be supplied. Submitted ads should be typed or clearly printed on an 8 1/2" x 11" sheet of paper.

4) Send ads to: the ARRL, 225 Main St., Newington, CT 06111 ATTN: Ham Ads. Or via fax 860-594-0259 or e-mail: rmicket@arrl.org Payment must be included with ads (check or any major credit card accepted).

5) Closing date for Ham-Ads is the 13th of the second month preceding publication date. No cancellations or changes will be accepted after this closing date. Example: Ads received November 13th through December 13th will appear in February *QST*. If the 13th falls on a weekend or holiday, the Ham-Ad deadline is the previous working day. Please contact Robin Micket, N1WAL at 860-594-0231 for further information.

6) No Ham-Ad may use more than 100 words. No advertiser may use more than two ads in one issue. A last name or call must appear in each ad. Mention of lotteries, prize drawings, games of chance, etc. is not permitted in *QST* advertising.

7) New firms or individuals offering products or services for sale must check with us to determine if a production sample (which will be returned) should be submitted for examination. Dealers are exempted, unless the product is unknown to us. Check with us if you are in doubt. You must stand by and support all claims and specifications mentioned in your advertising.

The publisher of *QST* will vouch for the integrity of advertisers who are obviously commercial in character, and for the grade or character of their products and services. Individual advertisers are not subject to scrutiny.

The American Radio Relay League does not discriminate in its advertising on the basis of race, color, religion, age, sex, sexual orientation, marital status, or national origin.

The League reserves the right to decline or discontinue advertising for any other reason.

**QSTHAM ADS ON THE WEB — UPDATED MONTHLY**  
<http://www.arrl.org/ads/ham-ads.html>

## ONV SAFETY BELT

P.O. Box 404 • Ramsey, NJ 07446

**800-345-5634**

Phone & Fax 201-327-2462

### New From ONV FULL-BODY HARNESS



**ONV Safety Belt with Seat Harness**



**\$94.95**

+ \$7.00 UPS

**ONV Tool  
Pouch \$15.95**

**OSHA**  
We Ship Worldwide  
Order Desk Open  
7 Day/Week

VISA M/C CHECK

**WITHOUT SEAT HARNESS**

- Adjustable to 42" waist
- Special Safety Lock
- 5,000 LB. TEST
- OSHA

**\$79.95**

Large to 56" add \$10.00  
ONV Tool Pouch \$15.95

+ \$7.00 UPS

VISA M/C CHECK

### TOWER CLIMBING LANYARDS

3 feet with large gorilla hook to  
clip on ONV Safety Belts. For  
use on towers, ladders, etc. + \$7.00 UPS

**\$39.95**

**NOW FEEL SAFE CLIMBING TOWERS**

THE Veteran Wireless Operators Association, a non-profit organization of communications people founded in 1925, invites your inquiries and application for membership. Write VWOA, Ed F. Pleuler, Jr., Secretary, 46 Murdock Street, Fords, NJ 08863.

### ANTIQUE/VINTAGE/CLASSIC

**ANTIQUE KEYS:** limited supplies. New, brass CMH, \$45; Breco, sealed \$65; unsealed \$55. Postpaid. Spy, spy-type, (QRP) other foreign varieties. SASE. TEC, Box 400, Lincoln, MA 01773.

### ANTIQUE RADIO CLASSIFIED.

Free sample copy! Antique radio's largest-circulation monthly magazine. Old radios, TVs, ham equip., 40s & 50s radios, telegraph, books & more. Ads & articles. Free 20-word ad monthly. Subscribe today. Six-month trial: \$19.95. Yearly rates: \$38.95 (\$55.95 by 1st Class). Foreign: write. ARC, PO Box 802-B19, Carlisle, MA 01741. Phone: 508-371-0512. Fax: 508-371-7129. Web: [www.antiqueradio.com](http://www.antiqueradio.com)

**BROADCAST MICROPHONES** and Accessories (Call Letter Plates, Stands) Wanted. Early carbon, condenser, ribbon, dynamic models used in broadcasting. James Steele, WK8X (FM), Box 2525, Kingsland, GA 31548, 912-729-6106.

**BUY, SELL, COLLECT AND RESTORE** early tube equipment? Early receivers, transmitters and telegraph gear? Join the Antique Wireless Association which sponsors old-time "meets", flea markets, museum and journal with technical articles and free want ads. Membership and annual dues only \$15. Write for information and Museum hours: Bruce Kelley, W2ICE, 59 Main St., Bloomfield, NY 14469.

**CALLBOOKS:** Buy/Sell/Trade U.S. Callbooks 1900/1975. Bob, K4JN, list SASE, PO Box 166, Annandale, VA 22003. 703-560-7161.

**CLASSIC RADIO REPAIR** 1920s-1980. Any make or model. Keith Zarin, KA4RGQ, 10841 Split Rail Drive, Manassas, VA 20112. 703-330-8457.

**CLASSIC RADIOS FOR SALE:** <http://www.radiofinder.com> Good used equipment wanted. The Radio Finder, 975 Arthur, Plymouth, MI 48170. Tel/Fax 313-454-4666. [finder@radiofinder.com](mailto:finder@radiofinder.com)

**COLLECTOR WANTS:** Early radios, parts, microphones, telegraph keys, tubes. Jerry Finamore, 1374 Stafore Drive, Bethlehem, PA 18017. 610-861-4660.

**DR. RADIO** repairs and restores vintage radios! Reasonable rates. All work guaranteed. Dr. Radio, Box 73, Weston, TX 75097-0073. Toll free: 888-73-K5DJH. E-mail: [k5djh@dhc.net](mailto:k5djh@dhc.net)

**MANUALS FOR MOST OLD HAM GEAR.** Best source for 20 years and now at lower prices! For most U.S.A. made ham gear + many Kenwood. No Quotes. Our catalog "P" (\$3) required to order or now get free info via internet at [www.hi-manuals.com](http://www.hi-manuals.com). Hi-Manuals, Box P-802, Council Bluffs, IA 51502.

**NATIONAL HRO, NC-125 and HRO-50T.** Excellent condition with accessories. Also, **Hallicrafters SX-100, SX-101, S-36, HT-37 & HA-6.** WA2BAH, 518-355-9632.

**NEW COLLINS SPOTTER'S GUIDE VIDEO** joins the KWM-2, S/Line, 301-1 and 305-1 Videos. Package Discounts! Hi-Rites Communications, 8232 Woodview, Clarkston, MI 48348-4058. 810-391-6660.

**OLD TELEGRAPH/ELECTRONICS WANTED!** Collector: K2DCY, 11 Squirehill, N. Caldwell, NJ 07006.

**TELEGRAPH INSTRUMENTS WANTED:** Collector buys early or unusual telegraph keys, sounders, and tubes electronic keyers. Also pre-1950 Callbooks. Vince Thompson, K5VT, 3410 N. 4th Ave., Phoenix, AZ 85013, 800-840-KEYS.

**W7FG VINTAGE MANUALS AND TELEPHONE FILTERS:** Most manuals in stock. SASE for catalog or call. Telephone RFI filters \$12.95. Visa/Mastercard accepted.

3300 Wayside Drive, Bartlesville, OK 74006. 918-333-3754 or 800-807-6146. <http://www.w7fg.com>

**WANT A HISTORY OF YOUR AMATEUR CALL?** Name and address of each prior holder since 1912 for \$20. Bob Arrowsmith, K4JN, PO Box 166, Annandale, VA 22003. 703-560-7161.

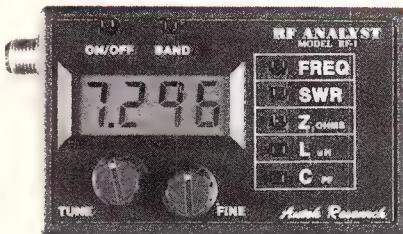
### QSL CARDS/CALLSIGN NOVELTIES

**BROWNIES QSL CARDS.** Free catalog of samples (stamps appreciated). 3035 Lehigh Street, Allentown, PA 18103.

**COLORFUL QSLs,** brilliant inks, polished card stock, with letterpress as done previously by C. Fritz. Send \$1 for samples to: COLORFUL QSLs, Box 4027, Lafayette, IN 47903-4027.

# Autek ADVANCED ANTENNA ANALYSTS™

## YOUR CHOICE FOR ACCURACY - CONVENIENCE - MODERN DESIGN



**RF Analyst™ Model RF1**  
\$129.95 (+\$6 s/h)

### FREQUENCY

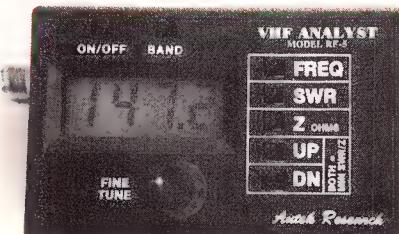
### SWR

### IMPEDANCE

### RF L & C

1.2 to 35 Mhz  
continuous

ORDER BOTH analysts for \$335  
(plus \$6 S/H). Cover all ham bands  
from 160 M to 440 MHz and most  
frequencies in between! Sorry, both  
must be ordered at the same time;  
no other discounts.



**VHF Analyst™ Model RF5**  
\$229.95 (+\$6 s/h)

### FREQUENCY

### SWR

### IMPEDANCE

### INSTANT SWR™

35 to 75 MHz &  
138 to 500 MHz  
continuous

**NEW!**

### SELF-CONTAINED

Both Analysts have a low power "transmitter" to go anywhere in their range, even outside ham bands. Use them to measure SWR curves, feedline loss, impedance and electrical length (e.g. 1/4 wave), baluns. Accurately adjust quad elements, Yagi's, slopers, dipoles, traps, mobile whips, phased arrays, matching networks. Determine the effect of adding vertical radials. Adjust your tuner without transmitting. Quality sine-wave generator. Many other uses. RF1 also DIRECTLY reads out L's and C at the RF frequency, not at 10 or 100 KHz. No lashups required as with other meters.

### EASY TO USE

Palm-sized, only about 8 oz. - a fraction of the size of others - with a big 1/2" LCD display that loves sunlight. Uses a single 9V battery. The display is big, not the cabinet. Simply take to your antenna, make measurements or adjust matching circuits, find out just how much to lengthen or shorten it in one trip. Make adjustments on the spot, at your antenna. Or measure at the shack end. ILLUSTRATED INSTRUCTIONS guide even a beginner through common measurements. The RF5's INSTANT SWR™ mode even slews to the frequency of lowest SWR (or Z) automatically!

### ADVANCED DESIGN

Analysts are MICROPROCESSOR based; use A/D converters. Errors are compensated in COMPUTER tables. All values are read DIGITALLY, not on analog meters. This yields a true INSTRUMENT. Accurate and repeatable. So why buy an older design? (Also see excellent review May, 1995 QST.)

### TRUE IMPEDANCE

The up shows TRUE magnitude of impedance everywhere, not just R at resonance. You can also find R & jX, including the sign of X, under many conditions. (SWR <5 is best.)

## DELUXE SWR & WATTMETER



**COMPUTING SWR  
REMOTE RF HEAD  
TRUE PEP & AVERAGE  
2KW or QRP**

Compare at \$200 +

### Model WM 1

\$129.95 (+\$6 s/h)

Analyst details: Impedance: 0-2000 ohms (RF1), 0-600 ohms (RF5). 1 ohm resolution. Z accuracy to 3% RF1; C1 to 9999 pF to 1 pF resolution. L<.04 to 300 uH. Autoranging. SWR 1.0 to 15.0 (RF1), 1.0 to 6.0 (RF5) 0.1 resolution. Crystal-controlled 4 digit frequency readout and accuracy at all frequencies, e.g. 1.200 to 500.0 uP auto turnoff to save 9V battery (not included). Cycle between two modes (e.g. SWR/FREQ) on command. RF5 uses stripline techniques, HP diodes, and costly commercial shielded oscillators. Both 5" x 2.5" x 1.5" ABS cabinet. UHF connector. Exact specs. are subject to change without notice. 1 year limited parts and labor warranty on all products. Made in USA.

## Autek Research

P.O. Box 8772  
Madeira Beach, FL 33738

**813-886-9515**

Order only direct with check,  
MO, MC, VISA. Add \$6 S/H in  
48 states. Add tax in FL. Add  
\$11 to Canada, Alaska, Hawaii.  
Add \$25 elsewhere. (Shipped  
air elsewhere.) Speedy  
insured shipment worldwide.

**KENWOOD**

TOLL FREE 1-800-238-6168 ALL STATES  
FAX 901-682-7165



SEE THE  
KENWOOD  
TS570-D  
& TS570-S

WE TRADE

FOR GOOD  
USED GEAR

MEMPHIS AMATEUR  
ELECTRONICS, INC.  
1465 Wells Station Road, Memphis, TN 38108

• VISA • COD  
• MASTERCARD  
OPEN 9-5, MON./FRI.  
SAT., 9-12

CONVERT YOUR 80 METER WINDOM or BUILD ANEW  
**The HOLY GRAIL Antenna**  
H. F. ALL BAND NO-TUNE ANTENNA (Even 160, 75 & 15 Meters)  
RETAIN THE EXISTING BANDS with even LOWER SWR  
COMPLETE-THOROUGH PLANS AND INSTRUCTIONS  
One parallel LC circuit in total antenna length (138')  
Send \$14 check or MO, name, call, address to:  
Smithdom Products, PO Box 780931, Wichita, KS 67278  
U.S. Patents issued and pending  
Need more Info? Send SSAE (#10, 32c) to above address

ARE YOU READY TO OWN THE VERY BEST?

**Texas BugCatcher**

GLA Systems

P.O. Box 425

Caddo Mills, TX 75135

1-800-588-2841 FREE CATALOG

Mobile  
Antennas

Unmatched in Quality  
Unmatched in Performance

Henry Allen, WB5TYD



**Analyzer & CableMate**



# ANTENNAS & ANTENNA ANALYZERS



**HALO-6**



**ISOPOLE**

The complete line of AEA analysts are now available **FACTORY DIRECT** at the lowest possible cost. Each analyzer gives a **graphical display of SWR** curves with variable sweep width and center frequency. For antenna tuning, you can set the analyzer for a single frequency and a beeping tone will allow you to tune for lowest SWR without having to look at the instrument. The **SWR-121 HF** analyzer covers 1-30 MHz and is priced at \$299.95. The **SWR-121 V/U** covers **120-175, 200-225 and 400-475 MHz** and is priced at **\$399.95**. Shipping and handling for each unit is \$7.50.

The AEA **CableMate™** graphical Time Domain Reflectometer (TDR) is packaged the same as the SWR analyzers. The CableMate shows multiple faults in a cable on the graphical display. Virtually any multi-conductor cable may be **tested for shorts, opens or impedance lumps**. The CableMate is an **excellent device for measuring the length of most any cable**. It will also directly show the 25 MHz return loss. The CableMate is priced at **\$299.95** plus \$7.50 shipping and handling for a **limited time only**.

All AEA analyzer products come standard with a **serial computer interface**. Store your graphical data with the applications software and interface cable for only **\$29.95 + \$3.00 S&H**.

We also manufacture the lowest cost high performance VHF and UHF vertical base station antennas available. Please send or call for our free booklet *Facts About Proper VHF Vertical Antenna Design* to find out why our IsoPole™ Antennas are **SUPERIOR** to the competition. Try our **IsoPole-144 VHF** antenna for **\$69.95** plus \$7.50 shipping and handling or the **IsoPole-440** antenna for **\$119.95** plus \$7.50 shipping and handling. The **HR-1** two meter telescopic antenna will give you 10 dB gain over a rubber duck antenna for your handie-talkie for only \$19.95 plus \$3.00 shipping and handling. Employ the **Halo-6** horizontal omni-directional antenna for six meters at **\$69.95** plus \$7.50 for shipping and handling.

**AEA**  

**Orders 1-800-258-7805**

**Tech Info: 760-598-9677 • FAX: 760-598-4898 • [wwwaea-wireless.com](http://wwwaea-wireless.com)**  
**Division of TEMPO RESEARCH CORPORATION**  
**1221 Liberty Way, Vista, CA 92083**

**Prices and Specifications subject to change without notice or obligation.**

**MULTIBAND HF DIPOLES**  
 Trapless closely spaced Multiband Antennas have a full size dipole for each band covered. These antennas can handle 5 KW and can be used in dipole or inverted Vee configurations. Only one 50 ohm cable is required. Antennas with an S suffix are half size and have a narrower bandwidth at the lowest frequency.

DP-7 Dipoles for 40, 30, 20, 17, 15, 12, 10	65' \$110
DP-8 for 80, 40, 30, 20, 17, 15, 12, 10 Mtrs	125' \$139
DP-8S DP-8 with a shortened 80 Mtr dipole	70' \$159
DP-9 for 160, 80, 40, 30, 20, 17, 15, 12, 10	245' \$189
DP-9S DP-9 with a shortened 160 dipole	130' \$210
DP-8040 Dipoles for 80 & 40 Meters	125' \$70
DP-8040S DP-8040 with short 80 Meter	70' \$90
DP-16080 Dipoles for 160 & 80 Meters	245' \$85
DP-16080S DP-16080 with short 160 Mtr	130' \$105
DP-16040 Dipoles for 160, 80, 40 Meters	245' \$99
DP-16040S DP-16040 with short 160 Mtr	130' \$120

Add \$8 Shipping. Checks, Visa, Master Card  
 Free Ham and Shareware Catalog.  
<http://www.hsv.tis.net/~dei> [dei@whnt19.com](mailto:dei@whnt19.com)

(205) 773-2758 DYNAMIC ELECTRONICS INC  
 FAX 773-7295 BOX 896 HARTSELLE, AL 35640

**QUALITY QSLs by WX9X**

**WX9X** from **\$18.95**  
 Write or Call for **FREE SAMPLES!**  
 55¢ SASE appreciated.

354 West Street - Valparaiso, IN 46383  
 Voice (219)465-7128 Fax (219)464-7333

**HI-PERFORMANCE DIPOLES**

Antennas that work. Custom assembled to your center freq. as band advised. Ht. of center and each end -hang as inverted "V" -horizontal, vert dipole, sloping dipole -commercial quality - stainless hardware - legal power - no traps. high-efficiency design.

Personal check, MO or C.O.D. (\$3)

MPD-5*	80-40-20-15-10M Max-Performance Dipole, 87' or 78' long....= \$110
MPD-2*	80-40-40M Max-Performance Dipole, 85' long = \$65, 105' long = \$ 72
MPD-3712	30-17-12M Max-Performance Dipole, 31 ft. long.....= \$ 73
HPD-3*	160-80-40M Hi Performance Dipole, select 113' or 125 ft. ....= \$ 83
SSD-6*	160-80-40-20-15-10M Space-Saver Dipole, 71 ft. long....= \$146
SSD-5*	80-40-20-15-10M... 42' long = \$110.....60 ft. long....= \$114

\*Tuners 9-Bands with Wide-Matching Range-Tuner. \$60 PER ANTENNA. ....= \$6.00

(2) Stamp SASE for 30 Dipoles, Slippers, & Unique Ants. catalogue

847-394-3414 W9INN ANTENNAS  
 BOX 393 MT. PROSPECT, IL 60056

**DOC'S QSL CARDS.** Free custom design - SASE for samples & price list. 8208 Broken Arrow Trail, Knoxville, TN 37923. 423-693-8810, or docs@ix.net

**ELEGANT, AFFORDABLE QSLs.** Samples \$1 (refundable with order). Elemental Designs, Dept. Q7094, 1639 Fordham, Mountain View, CA 94040.

**ENGRAVING:** Callsign/Name Badges by W0LQV. SASE for price sheet. Box 4133 Overland Park, KS 66204.

**FREE SAMPLES.** Write, Email, phone or Fax to QSLs by W4MPY, Box 73, Monetta, SC 29105-0073. Phone or Fax 803-685-7117. Email: W4MPY@PBTComm.Net

**HIGH QUALITY** custom QSL cardbox filing systems, mylar laminated index cards. DXCC, States and more, laminated contest keyboard overlays. HAMSTUFF by W7NN, 360-352-2461. W7NN@aol.com

**NEW CALL?** Show it off with nametags, caps, car tags, plaques and more! Call for a free catalog. Shirts & Caps, Inc., 38530 Fifth Avenue, Zephyrhills, FL 33540. 800-851-4020.

**QSL CARDS:** Fast quality service. Samples \$1 (refundable with order). WordWise Services, 107 Giles Court, Newark, DE 19702.

**QSL CARDS** Many styles. Top quality. Order Risk Free. Plastic cardholders, T-Shirts, Personalized caps, mugs, shirts. Other ham shack accessories. Free Call. Free samples. **Rusprint**, 800-962-5783.

**QSL SAMPLES** \$1 refundable, Bud Smith, Box 1948, Blaine, WA 98231.

**QSLs:** 20 years top quality at reasonable prices. Send 55¢ #10 SASE for samples. Request special samples for railroaders and railfans. Mahre & Sons Print Shop, 2095 Prosperity Rd., Maplewood, MN 55109-3621.

**QSLs** - Low cost available in small quantities with lots of options. Parma Graphics, K2BKA, 5 Rondout Harbor, Port Ewen, NY 12466. 914-339-1996.

**QSLs** - OVER FIFTY DESIGNS! Custom cards. "Eyeball" cards. Samples \$1 (refundable). Charlie Hansen, N0TT, RR1, Box 108-B, Napoleon, MO 64074.

**QSLs** - Quality for less is back! See our display ad in this issue of **QST**. Greg W. Eckert Printing, 7 Carlton Ave., Washington, NJ 07882.

**QUALITY QSLs** By WX9X from \$18.95. See our display ad on this page.

**QUALITY QSLs** - Samples 50¢. Olde Press, WB9MPP, Box 1252, Kankakee, IL 60901.

**WEB SURFERS** - Check out our QSL offering on the World Wide Web. <http://www.mindspring.com/~w4mpy/>

**HAM VACATION RENTALS/PROPERTY**

10 YR. OLD 2220 sq. ft. tri-level, 620 sq. ft. finished carpeted basement office & ham shack, attached 880 sq. ft. finished garage on 5 acres with stream at bottom of hill. 1st class contest - DX 2 station installation. 110' 45G TH-7 plus 2 el. 40 at 120', 73' 25G TH-7, etc. Shenandoah Valley at I-81 & WVVA line. Marc commuter train 15 min., Dulles 65 min., Frederick 50 min. \$185,000. W9LT, 304-229-7711 Bunker Hill, WV or Wendy Baruch (Prudential realtor), 800-243-8358.

**B&B WITH A HAM!** Enjoy hamming from Hawaii. Join those that have chased DX from beautiful upcountry Maui! (Non smokers only, thanks). "SEA Q MAUI," KH6SQ, call collect 808-572-7914. E-Mail: [terry.clayton@mauigateway.com](mailto:terry.clayton@mauigateway.com)

**BAHAMAS RENTAL:** Abaco villa w/station. N4JQQ, 901-374-0927.

**BAHAMAS,** Treasure Cay Resort. Beach house/contest station rental. Many world records. 3 BR/2 Bath. KC4SZE, 205-734-7300 or 809-365-8146.

**DO-IT-YOURSELF DXpedition.** Stay at Ron Sefton's ZF8AA on Little Cayman Island. 2br cottage, beach, quad, rig. Fish or dive if band folds. Write Davey Ent., P.O. Box 2144, Grand Cayman, B.W.I. Phone 809-949-0070, fax 809-949-7399.

**HAM VACATION:** Rent 4 bedroom Chalet in spectacular Colorado Rockies. TS-930S, 40 meter beam, log periodic and wire antennas included. \$500 weekly. Bus. SASE, Ken, W0LSD, Box 156, Buena Vista, CO 81211. 719-395-6547. Available for fall/winter contest weekends.

**MISSOURI OZARK PARADISE.** Nearly new brick 2,000 sq. ft. hilltop home, 3 BR, 2.5 baths, huge workshop, 120 acres, 73' tower, \$199,500. Call Sue: T-Bone Realty, tollfree 888-967-2888.

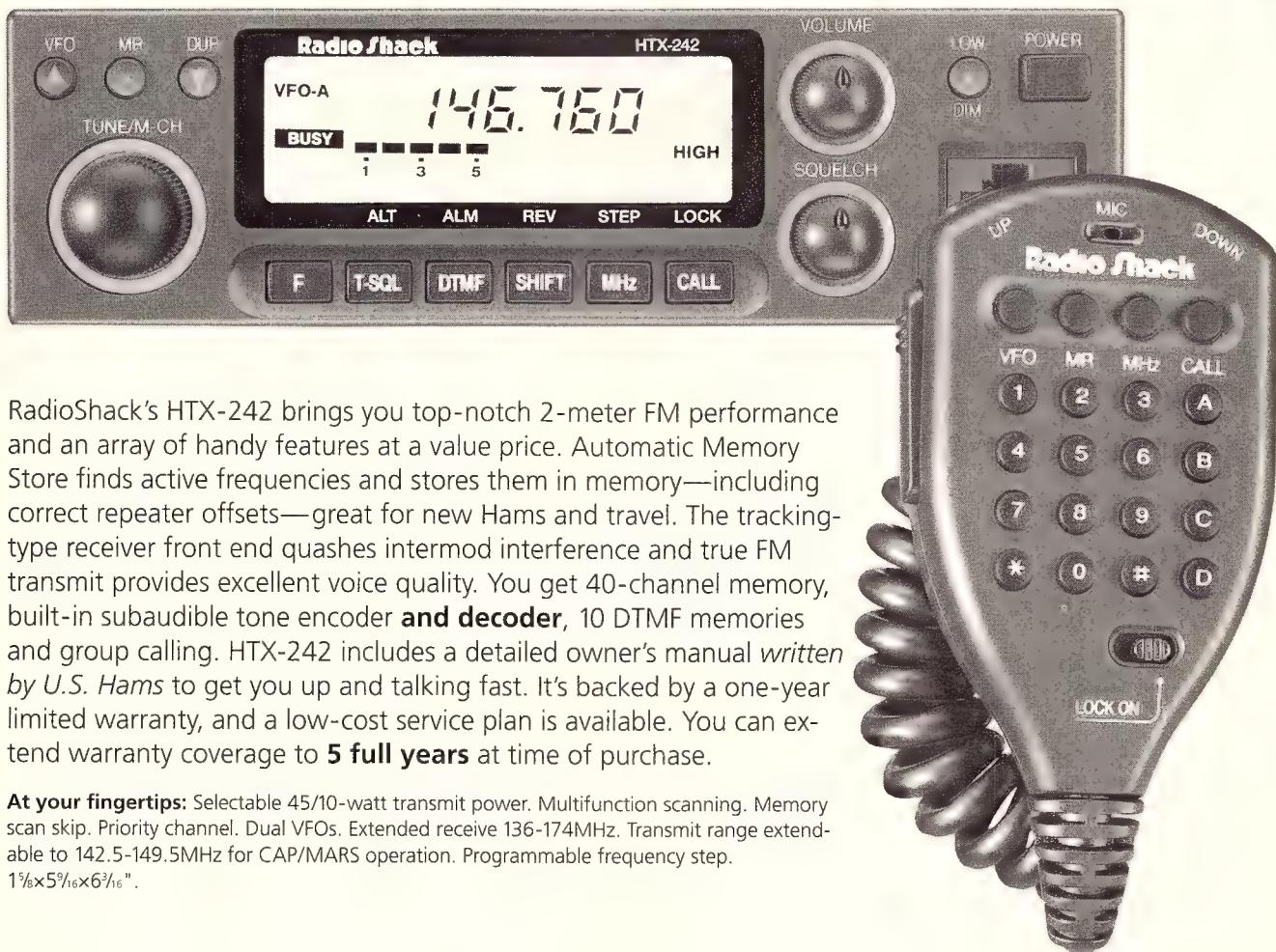
**MINI-CONTEST STATION:** Operate from CO with yagi for 40 meters and Log for 10/20. Slopers on 75/80. TS-930s supplied. SASE. W0LSD, Ken, Box 156, Buena Vista, CO 81211. 719-395-6547. [diverken@chaffee.net](mailto:diverken@chaffee.net)

**P49V's ARUBA** Cottage for rent; 2 bedrooms, rig and monoband antennas. For info write: Carl Cook, 2150 Piedmont Way, Pittsburg, CA 94565.

# FULL-FEATURED!

RadioShack's 45-watt 2-meter FM mobile Amateur Radio transceiver

Only \$299<sup>99</sup>



RadioShack's HTX-242 brings you top-notch 2-meter FM performance and an array of handy features at a value price. Automatic Memory Store finds active frequencies and stores them in memory—including correct repeater offsets—great for new Hams and travel. The tracking-type receiver front end quashes intermod interference and true FM transmit provides excellent voice quality. You get 40-channel memory, built-in subaudible tone encoder **and decoder**, 10 DTMF memories and group calling. HTX-242 includes a detailed owner's manual written by U.S. Hams to get you up and talking fast. It's backed by a one-year limited warranty, and a low-cost service plan is available. You can extend warranty coverage to **5 full years** at time of purchase.

**At your fingertips:** Selectable 45/10-watt transmit power. Multifunction scanning. Memory scan skip. Priority channel. Dual VFOs. Extended receive 136-174MHz. Transmit range extendable to 142.5-149.5MHz for CAP/MARS operation. Programmable frequency step. 1 $\frac{1}{8}$  x 5 $\frac{5}{16}$  x 6 $\frac{3}{16}$  ".



**RadioShack**<sup>®</sup>  
You've got questions. We've got answers.<sup>®</sup>

Price applies at participating RadioShack stores and dealers. Items not available at the advertised price at a participating store can be special-ordered (subject to availability) at the advertised price. A participating store will offer a comparable value if the product is sold out. Independent RadioShack dealers and franchisees may not be participating in this ad or stock or special-order items advertised.

## New Simplex Autopatch

Use it like a cellular phone

Only \$144!!

An Affordable  
Autopatch  
packed with  
Incredible  
features!!!!



Requirements

- 1) Telephone line
- 2) 12v Power Supply
- 3) 2 dual band transceivers
- 4) Mic. connector that fits your transceiver

**Full/Half Autopatch Only \$109.00**

### Automatic CW identifier

(The Autopatch will automatically send call sign in CW when activated/deactivated)

### Programmable time out function

(If you accidentally get out of range, the Autopatch will time out and hang up the phone line.)

### User selectable password

(Select personal password up to 9 digits to activate your autopatch)

### Reverse patch

(If you choose so, it will page you when your phone rings)

### Adjustable Volume

### Easy Installation

**Compact size 1" x 3-3/8" x 5/8"**

## Pocket Morse Code Trainer

Learn code faster and easier

Better than code tapes

Take it anywhere to practice

Light weight and compact

Ideal for beginners to advance

\*Selectable code

rates 3-33 wpm

\*User friendly menu

\*Plays Standard

and Farnsworth

\*Plays continuous

fresh random code

\*Size 2 3/8x4.5x1

\*Selectable random character playing

\*Runs 30 hours on a 9 volt battery

\*Continuous newly \*One year warranty

generated QSO (like the general exam)

**Ultimate Plus Only \$69.99**

With LCD Display

**Deluxe Plus Only \$44.99**

Is like the Ultimate except has no LCD

**Standard Plus Only \$29.99**

Is like the Deluxe except has no internal speaker or random codes

### Six Modes of Operation

- 1) Continuous Fresh Random Code
- 2) Test for Copying Random Code
- 3) Plays Continuous New QSO or Basically a Conversation Between Two People
- 4) Selectable Random Code
- 5) Interactive Code Training
- 6) Playing Random Words

## DTMF CONTROLLER AND DECODER

Get 2 Features For The Price of 1!

### DTMF Decoder

\*Decodes and Stores

80 digits

\*High speed Decoder (Up to 25 tone/sec)

\*Runs on a 9V battery or 7.2 to 15V

\*Digital display



**DTMF Controller \$85.99**

\*Manual override reset

\*Wrong Number reset

\*5 output (4 of which are transistor output and 1 is mechanical relay)

**Computer Aided Technology, Inc.**  
4525 Production Drive, Dallas, Texas 75235

Phone: 214-350-0888

Visa/MC Accepted, Plus S/H, Tax if Applicable

## EVERY ISSUE OF QST on Microfiche!

The entire run of **QST** from December, 1915 thru last year is available.

You can have access to the treasures of **QST** without several hundred pounds of bulky back issues. Our 24x fiche have 98 pages each and will fit in a card file on your desk.

We offer a battery operated hand held viewer for \$75, and a desk model for \$260. Libraries have these readers.

The collection of over 1,700 microfiche, is available as an entire set, (no partial sets) for \$595, plus \$15 shipping (US). Annual updates available for \$10 plus \$3 shipping. Your satisfaction is guaranteed!

### BUCKMASTER

6196 Jefferson Highway  
Mineral, Virginia 23117

540:894-5777•800:282-5628

e-mail: [info@buck.com](mailto:info@buck.com)

Fax 540:894-9141

## ARRL MicroSmith version 2.3

The latest version of the popular Smith Chart simulation program.

Available Now!

Order No. 4084 —

\$39 plus \$6 shipping.

### The American Radio Relay League

phone: 888-277-5289 (toll-free) • fax: 860-594-0303

225 Main Street

Newington, CT 06111

email: [pubsales@arrl.org](mailto:pubsales@arrl.org)

<http://www.arrl.org/>

SUPER-CONDO for sale: 1,950 sq. ft., 2 BR, 2 BA, large LR and kitchen. Approved R-5 vertical. N.W. Austin, TX. \$138,000. Dick, KB5BBU, 512-918-1697.

**TURKS AND CAICOS "HAM-LET" VACATION:** House with station located **Providenciales** hillside above ocean. Jody Millspaugh, 809-946-4436 or Box 694800, Miami, Florida 33269 USA. E-mail: [jody@caribsurf.com](mailto:jody@caribsurf.com)

### GENERAL

140+ HAM CLIPART images on PC 3 1/2 disks. Many topics, special sections for club newsletters, designing QSL cards. \$25. D'Laubach, Box 20-WQ7B, Carter, MT 59420. **GREAT GIFT IDEA!**

**1998 CALLBOOK CDROM** "Flying Horse": \$39.95 (available Dec. 5). Callbooks (Final Edition) \$32.95 each. **QRZ!** CDROM (12/97): \$16.95. **ARRL**: 1997 Handbook, \$25.95; 1998 Handbook \$30.95; Antenna Book (18th), \$26.95. **POSTPAID USA/Canada** (DX: add \$3/item). Duane Heise, AA6EE, 16832 Whirlwind, Ramona, CA 92065-7011. Phone orders: 760-789-3674. [aa6ee@amsat.org](mailto:aa6ee@amsat.org)

**1998 CALLBOOK CDROMs.** Best deal, fastest service from KC3NE on new "Flying Horse" Radio Amateur Callbook CDROM! It's \$39.95 postpaid USA/Canada, \$42.95 including air postage elsewhere. **Bonus** (only from KC3NE): Exclusive supplemental database (on 3.5 in. disk running Windows) that **instantly** updates new CDROM with 5,000+ changes since press time. It's free if delivered by email, or \$5 additional if 3.5 in. disk is mailed. (Want supplement only? \$4 by email, \$7 by mail postpaid.) CDROM due late November; supplement 1 week later. Check/MO/Visa/MC: Mike Klein, Box 306, Cheltenham, PA 19012. Phone/fax: 215-396-2389; [mklein@voicenet.com](mailto:mklein@voicenet.com)

**59(9) DX REPORT.** Weekly DX and Contest bulletin. SASE for sample. P.O. Box 73, Spring Brook, NY 14140.

**AMATEUR EQUIPMENT SERVICE:** Out of warranty repair of HF amplifiers. John Hill, 29 Kelseyton Rd., Killingworth, CT 06419. 860-663-2153.

**AMERITRON AL80A** \$550, MFJ VersaTuner V (989B) \$175, both immaculate. Scott, NW11, 508-287-4394, MA.

**AMIGA A2000 COMPUTERS WANTED.** Top dollar paid—including shipping costs. Call Paxtron Corp., 800-595-5534 or 914-578-6522.

**APPLE I** Microcomputer wanted for museum. KK4WW, 540-231-6478.

**ASTRON POWER SUPPLY**, Brand new w/warranty, RS-20m \$99, RS-35m \$145, RS-50m \$209, RS-70m \$249. AVT, call for other models, 626-286-0118 or [aj547@lafn.org](mailto:aj547@lafn.org)

**ATTENTION HT OWNERS**—Need portability and base station power in one unit? **THE RIGGER** provides platform for both. Ideal addition to your shack or field operation. Over 3000 in use. Lifetime warranty. \$24.95 includes S&H. SASE Gary Branch, N5BI, 415 So. Myrtle School Rd., Gastonia, NC 28052. <http://www.cltonline.com/riger>

**ATTENTION SB-200 & SB-220 OWNERS:** Restore and up-grade your tired old amplifier with our parts and kits. Power supply boards, soft keys, soft starts, new fans & motors, many more items. Write for details. **Please specify the model.** Harbach Electronics, WA4DRU, 2318 S. Country Club Road, Melbourne, FL 32901-5809. <http://www.hrbach.com>

**ATTENTION YAESU FT-102.** Expert repairs. Over 6000 hours servicing the 102. Reasonable rates. Call evenings, Mal, NC4L, 954-961-2034.

**AVVID** is an authorized **Kenwood** and **Icom** service center for warranty and non-warranty repairs. Reasonable rates and fast turnaround. E-Mail to [avvid@onramp.net](mailto:avvid@onramp.net) or call 800-214-5779. AVVID, 222 N. Story Rd., Suite 128, Irving, TX 75061.

**AZDEN** Service by former factory technician. Fast turnaround. Southern Technologies Amateur Radio Inc., 10715 SW 190th Street #9, Miami, FL 33157. 305-238-3327.

**BOY SCOUTS** need you! Donate radios and equipment. [Tax free 501(3)(c)] Mark, N6WBC, 714-427-0675. [mdh@pacbell.net](mailto:mdh@pacbell.net)

**BUSINESS FOR SALE!** Amateur Radio Business with store in metropolitan area. Mail order and in-store sales increasing steadily. Dealerships with most major suppliers of radios and accessories. Owner has other business interests and must sell this one! Northwest U.S. area. E-mail serious inquiries to [hamman4@juno.com](mailto:hamman4@juno.com)

**CASH FOR COLLINS.** SM-1, 2, 3; 312A-1, 2; 55G-1; 399C-1; KWM-380; 62S-1; KWM-1; 302C-3; any American tube radios. Also buy estates. Leo, KJ6HI, ph/fax 310-670-6969.

**CAT SYSTEM INTERFACE CABLE** "LCU-3" works with most CAT capable transceivers. Discounted to only \$39.95. 800-413-1129, fax 909-987-7761. <http://www.sarrio.com> or [wb6siv@cyberg8t.com](http://wb6siv@cyberg8t.com)

## CONVERT YOUR AVERAGE READING WATTMETER TO PEP READING FOR LESS THAN \$20!

The PDC-1 is a universal Peak-Hold circuit that will convert ANY wattmeter, including the Bird 43, to true PEP reading! All that is required is a DPDT switch to choose between PEP and Average readings, and 6-12 VDC or 6.3 VAC power connections.

The PDC-1 measures 2" X 1.5" and fits neatly inside most wattmeters without any modification.

The PDC-1 is available for \$19.99 (post paid in North America) in ready to assemble kit form.

Please add \$3.00 postage for orders going outside of North America. Visa and Mastercard accepted! Don't forget to visit our new Home Page on the www!

**HI-RES COMMUNICATIONS, INC.**  
3232 Woodview Dr., Clarkston, MI 48348-4058  
(248) 391-6660 (PHONE & FAX):  
E-mail: [hi-res@rust.net](mailto:hi-res@rust.net) • <http://www.rust.net/~hi-res>

## DISCOUNT PRICES

PL-259ST	Silver-Teflon®, USA, Gold pin	SALE \$1.00
PL-259GT	Gold-Teflon®, USA	\$1.49 or \$30/25
N/9913	For 9913, 9086, 9086, Flexi, etc.	\$3.25
N/9913S	As above but Silver & Teflon®	\$4.25
N-200ST	"N" Silver-Tef, installs like PL-259	\$3.25
RG-8X	Premium quality, 95%, black	SALE 14¢
RG-8X+	95%, Type IIA, non-contaminating	23¢
RG-213+	Top quality, 97% shield, IIA jacket	38¢
International	9086 9913-type of the highest quality	51¢

ExtraFlex Flexible 9913 type

59¢

RG-213 95%, Mil-Type

35¢

R1 Rotator 8 cond. (2 x #18, 6 x #22) SALE

20¢

R2 Rotator 8 cond. (2 x #16, 6 x #18) SALE

35¢

#14 Hard-drawn, 7x22, all copper, bare

8¢

#14 FlexWeave™ 168-strand, bare copper

12¢

#12 FlexWeave™ 259-strand, bare copper

19¢

HD Ladder Line 450 ohms, stranded #16 cond.

18¢

Super Ladder Line, stranded #14 cond. Sale

24¢

1/2" Tinned Copper Braid ground strap, any length

65¢

Coax & Cable prices are per foot, sale price is for 50 foot multiples

LadderLock™ Center insulator for ladder-line \$11.95

Copper Ground Strap, 6" all copper \$1.49

Custom Coax Jumpers - made to order.

Pulleys - for antenna support rope. Highest quality, sailboat type made for fibrous rope. For 3/16" rope \$11.95 and for 5/16" rope \$13.95

New! 6 meter BigSig 6™ Loop

Radiation pattern is in the background on this page.

Only 13' 7" high. Low SWR. 2:1 bandwidth is 4 MHz. Special, high efficiency VHF matching transformer. #14 wire. Excellent performance, and it's easy to put up. Only \$50, two for \$89.95

### Antenna Support Line

Mil Spec, Dacron® Antenna Support Line, solid, single braid, sun resistant, 3/16" 700# test, 100' hank \$8

Kevlar - Dacron® Jacket for sun protection, 500# test, for guying verticals, booms, etc. .075" dia. 200' spool \$15.95

# RADIO WORKS

## Antenna Fever

A new catalog is in the works and this may be the last chance to take advantage of 1995 prices. Order NOW!

SuperLoop 80	122' long, 80 - 10 m. If you want the best, this is it!	\$89.95
SuperLoop 40	56' long, 40 - 10 m. Small size, Great Big Signal.	\$79.95
CAROLINA WINDOM 80	132' long, 80 - 10 m, If you hear one, you'll want one!	\$79.95
CAROLINA WINDOM 40	66' long, 40 - 10 m. It helped set two 40 meter records.	\$79.95
CAROLINA BEAM 80	80 - 10 m, 100' long. Be ready, the sunspots are returning.	\$89.95
CAROLINA WINDOM 160 Special	160 - 10m, 132' long. All bands	\$99.95
BigSig 40	3/2 wavelength loop, 40 m, low SWR, Effectively Double your power.	\$65

## CURRENT BALUNS

Models for every application

B1-2K	1:1	2 KW	Current-type	80-10 m	\$18.95
B1-5K	1:1	5 KW	Current-type	160-10 m	\$29.95
<b>B1-1KV</b>	<b>1:1</b>	<b>1 KW</b>	<b>Current-type VHF</b>	<b>15 - 2 m</b>	<b>\$25.95</b>
Y1-5K	1:1	5 KW	Current YagiBalun™	160-10	\$29.95
<b>B4-1KXV4:1</b>	<b>1 KW</b>	<b>Current-type VHF</b>	<b>15 - 2 m</b>	<b>\$29.95</b>	
B4-1.5K	4:1	1.5 KW	Voltage-type	80-10 m	\$22.95
B4-2K	4:1	2 KW	Voltage-type	80-10 m	\$29.95
B4-2KX	4:1	2 KW+	Current-type	160-10 m	\$39.95
RemoteBalun	4:1	High Pwr, current-type		160 - 10 m	\$47.95

Here's the new Super Line Isolator Lineup

4K-LI	Line Isolator	SO-239 in, SO-239 out	\$19.95
4K-LIG	Grounded Line Isolator	SO-239 in and out	\$25.95
<b>T-4</b>	<b>Ultra Line Isolator, replaces 4KV, 4KRF, T-3</b>		<b>\$29.95</b>
T-4G	As above, but direct grounding version		\$33.95
<b>T-6</b>	<b>10 &amp; 6 m Line Isolator, SO-239 in and out</b>		<b>\$25.95</b>
T-6G	As above, but direct grounding version		\$28.95

Check out our 45 minute Web Site

**RadioWorks.com**

e-mail [jim@RadioWorks.com](mailto:jim@RadioWorks.com)

### General Catalog FREE

Catalog 961 & Supplement 971. 112 pages of complete high performance antenna systems, baluns, Line Isolators, wire, cable, coax, station goodies. If you don't shop here, you won't get the best prices. Allow 2 or 3 weeks for bulk mail delivery or send \$2 for Priority Mail.

## The RADIO WORKS

Order Hotline (800) 280-8327

FAX (757) 483-1873

Orders & Technical (757) 484-0140

Box 6159 Portsmouth, VA 23703

VISA and MC welcome. Give card #, exp. date, signature. Add shipping (figure 10%, \$6 min.) Mention this ad for sale prices. Prices/specs subject to change.

*"The Northwest's Largest Ham Convention"*



**SEAOPAC**



**NORTHWEST DIVISION HAM CONVENTION**

**May 30 & 31, 1998**

**Seaside Convention Center, Seaside Oregon**

Special ARRL Seminar on Friday, May 29:

*"RF Safety Seminar - The FCC RF Exposure Regulations" by Ed Hare, W1RFI*

Commercial Exhibits

Banquet

30+ Seminars

YLRL Luncheon

NO

SALES TAX  
IN OREGON

Giant Flea Market

Special Interest Group  
Meetings

V. E. Testing

And Much More - Right on the Beautiful Pacific Northwest Ocean Beach

GENERAL INFORMATION CALL

RANDY STIMSON, KZ7T

(503) 297-1175

EXHIBITORS CALL

AL BERG, WB7SIC

(503) 640-5456

ICOM • YAESU • ALINCO • STANDARD • KANTRONICS • R.F. CONCEPTS  
**ASSOCIATED RADIO****SERVICE FACILITIES AVAILABLE • CALL FOR DETAILS**

WE TRADE USED FOR USED, AND BUY USED EQUIPMENT

WE BUY AND SELL TOP QUALITY AMATEUR EQUIPMENT FROM VINTAGE TO STATE OF THE ART

**PRICING & ORDERS 1-800-497-1457**

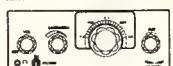
8012 Conser - Box 4327, Overland Park, KS 66204

USED/TRADES: 913-381-5900 FAX: 913-648-3020 E-MAIL: worldwide@associatedradio.com

**Website:** [www.associatedradio.com](http://www.associatedradio.com)

Send \$3.00 for catalog and used equipment list.

MFJ • W5YI • VALOR • BUTTERNUT • ASTRON • GENESYS

**QRP KIT FUN**

NW MONO 80,40,30,20

\*Selective Superhet\*Variable Bandwidth  
\*Sharp Audio Filter\*Full QSK\*RIT\*5 Watts  
\*+80/40 Novice\*Test-As-You-Go\*Cabinet,  
Painted & Screened\*Complete kit \$130.00  
W/S&H (US) \*No cards, your check OK !\*  
EMTECH 3641A Preble St. Bremerton,  
Wa. 98312 (360) 415-0804  
roygregson@aol.com



BILAL COMPANY  
137 MANCHESTER DRIVE  
FLORISSANT, COLORADO 80816  
(719) 687-0650

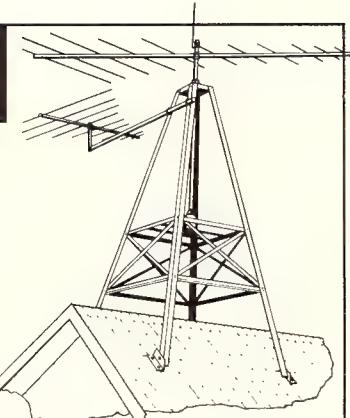
**Roof Towers****ORDER TODAY / Ship Today****Anodized Aluminum Construction****Lightweight - yet - Extra Heavy Duty****High Quality / Stainless Steel Bolts**

**Also Thrust Bearings,  
Masts, Lightning Rods**



13620 Old Hwy 40  
Boonville, MO 65233  
(816) 882-2734  
<http://www.glenmartin.com>

**See Our Last  
Add for Towers  
and Hazer**



CHASSIS &amp; CABINET kits. 5120 Harmony Grove Road, Dover, PA 17315, SASE K31WK.

CLEANING HOUSE: James Millen scope 90921 and 90903 plus new CRT. Heath QF-1 Thordarsen 5423 modulation xfm PP811-813. Pair of new 812A. Any or all for cost of COD shipping. Carl, W2IQK, 914-355-1596.

COLLINS TUBE SETS: KWM2 75A4 \$100, 75S3B \$70, 32S3 \$60. Guaranteed. WE2T, 716-334-1103.

COLLINS: your 30L1 is in need of a new capacitor replacement kit made in USA; 1000 watts P.E.P. output voltage doubler. Steve Pautard, WN4I, 5833 Dryden, West Palm Beach, FL 33415. 561-689-8819.

COMMODORE 64 repair. Fast turnaround. Southern Technologies Amateur Radio Inc., 10715 SW 190th Street #9, Miami, FL 33157. 305-238-3327.

COMMODORE P.C. 128/64: Disk drive 1571, printer Star Matrix SG-10C, color monitor, Thomson 36512-IV, packet PK-64, boxes, manuals, exc. cond. \$190. K1CEI, 617-893-3377.

COMMODORE/AMIGA AUTHORIZED REPAIR SERVICE: Paxtron is the largest Commodore/Amiga computer service center in the country. We also sell parts and upgrades. Check out our web page for complete list of parts and services at [www.paxtron.com](http://www.paxtron.com) or call 800-595-5534 or 914-785-6522 or e-mail us at [paxtroncorp@rcknet.com](mailto:paxtroncorp@rcknet.com)

COMPUTERS-WANTED early Pre-1980 microcomputers for museum collection. Also early magazines and sales literature. KK4WW, 540-231-6478/763-2321.

CONTEST LOGGERS. EI5DI's Super-Duper. <http://www.iol.ie/~okanep>CONTROL YOUR Repeater Controller with our controller programming utilities. Support for Scom, ACC, Link, & CAT. WD8KNL, [www.netcom.com/~sigridco](http://www.netcom.com/~sigridco) E-mail: [sigridco@ix.netcom.com](mailto:sigridco@ix.netcom.com)

CRYSTALS: FT-243's for QRP, vintage equipment made to order. 160-2 meters. 4 stamps or \$1 for catalog/circuit package. C-W Crystals, 1714 N. Ash, Nevada, MO 64772.

DIGITAL FIELD strength meters: <http://www.digifield.com>

DRAKE L-4B linear/L4PS, Drake TR7A transceiver/PS/RV-7 remote, Econo keyer 11 MFJ-401B, Bencher key, Drake W4 wattmeter, Heathkit SB610 monitor, Yaesu FT-227R 2 meter, Kenwood TM-401B 440 MHz, Astron RS-20A PS, Drake 3300-LP filter. Best offer. W8VHY, 3284 Yeoman Rd., Washington C.H., OH 43160.

DUSTCOVERS: Plastic dustcovers for the following paddles: Bencher, Vibrokeyer, Vibroplex lambic, and MFJ-564 with your call engraved. \$14 includes S&amp;H. Larry Stamm, 28 Topton Road, Kutztown, PA 19530.

DX HEADING Maps and Lists. W2HOJ, 800-941-2252.

DXers: Weekly DX Newsletter -QRZ DX- since 1979. Send #10 SASE for samples. Bi-monthly **THE DX MAGAZINE** -DXpedition reports, awards, DX news, QSL information, technical articles, etc. Send \$2 for sample copy. DX Publishing, Inc., PO Box 16522, Asheville, NC 28816-0522. Phone/Fax 704-683-0709.EASYTERM for Windows. Full featured software for AEA, Kantronics and HAL TNC's. THIS GREAT PROGRAM DOES IT ALL! See us at: <http://www.tiac.net/users/henley/ezyterm.html> or for a brochure, call toll free 888-336-7796 or write to Martha's Vineyard Henley's, Box 2154, Edgartown, MA 02539-2154.

ELECTRIC RADIO Magazine in our ninth year. Articles on vintage ham and military gear, repair/restoration, history, and AM operation. Large classified section. \$3 for a sample copy, ER, 14643 County Road G, Cortez, CO 81321.

ELECTRON TUBES. Bought and sold. Large inventory equals fast delivery. Daily Electronics, 10914 NE 39th St. Ste. B-6, Vancouver, WA 98682. 800-346-6667, fax 360-896-5476. 3-400Z special \$90 Eimac.

ELECTRONIC COMPONENTS AND KITS. Catalog \$1. Dan's Small Parts and Kits, Box 3634, Missoula, MT 59806. Web: <http://www.fix.net/dans.html>

F.O.B. SELL: Collins 75A4 filters .500, .800, 1.5, 2.1, 4.0, 6.0 K.C., \$1800, won't breakup. Gates BC1F on 1888, \$2500; SX-42 \$175, HT-9 \$275, SX-99 \$135. Want to buy Eimac 1000-T tubes. K8CCV, 330-427-2303, 6 p.m. EST weeknights.

FOR SALE: 50 ft. Universal aluminum tower, Ham M-3 rotor, Mosley classic 33 beam - 3 element - 10, 15, 20 - all cables, excellent, you take down. \$850. W8VHY, 614-335-5297.

FOR SALE: Hammarlund HQ100, \$150. Bob, WD4OHD, 423-843-2160.

FOR SALE: Icom 737A transceiver, mobile mic, SM-8 desk mic and Astron AC power supply. manuals and original packing. All in mint condition. \$875 or best offer. Frank Jenne, W4JKT, 2113 Fernleaf Lane, Florence, SC 29501. 803-669-8550.

MODEL	Hite feet	Top to Rotor	Base width	Max. Ant. in sq. ft. @ 87 mph	100 mph	112 mph	Max Ant load	Wgt lb.	Price w/ UPS
RT-424	4.5	34.75	24"	6	4.5	3.6	100 lb.	22	\$159.95
RT-832	8.0	43.75	32"	8	6	4.8	120 lb.	36	\$229.95
RT-936	9.0	43.75	36"	18	13.5	10.5	130 lb.	78	\$389.95
RT-1832	17.5	37.62	32"	12	9	7.2	110 lb.	88	\$524.95

# BATTERIES

BUY DIRECT FROM US, THE MANUFACTURER

## Season's Greetings

### 12% OFF

ON: NiCd and NiMH REPLACEMENT BATTERY PACKS  
MASTERCHARGERS • POWERPAC+

FOR THE MONTH OF DECEMBER

Monthly Discounts Applicable to End-Users Only  
Look for January's Special of the Month



NYS residents add 8.5% sales tax. Add \$4.00 for postage and shipping.

Prices and specifications subject to change without notice

**W & W ASSOCIATES**

800 South Broadway, Hicksville, NY 11801

In U.S.A. & Canada Call Toll Free 800-221-0732

In NY State Call (516) 942-0011 • Fax (516) 942-1944

w-wassoc@ix.netcom.com  
http://www.wwassociates.com

World Wide Distributorships Available, Please Inquire

MADE  
IN  
THE U.S.A.  
SEND FOR  
FREE CATALOG  
AND PRICE LIST

**From The Newest To The Coolest**

## YAESU Is #1!

**\$100  
Coupon!**



FT-920  
HF+ 6M Transceiver

**World's  
Smallest!!!**



FT-50R  
Ultra-Compact  
Dual-Band  
Handheld

**Coupons Good  
Limited Time**



FT-8100R  
Compact Dual-Band Mobile

**\$35  
Coupon!**



FT-2500M  
2 Meter, FM Mobile

**\$20  
Coupon!**

**\$30  
Coupon!**

**LARGE SELECTION OF USED GEAR!!!**



P.O. Box 6522  
220 N. Fulton Avenue  
Evansville, IN 47719-0522

Store Hours  
MON-FRI: 8AM - 5PM  
SAT: 9AM - 3PM

**CENTRAL TIME**  
WARRANTY SERVICE CENTER

**FOR SERVICE  
INFORMATION CALL  
(812) 422-0252  
MONDAY - FRIDAY**

TERMS:  
Prices Do Not Include Shipping.  
Price and Availability Subject to  
Change Without Notice  
Most Orders Shipped The Same Day  
COD's Welcome



ORDERS & PRICE CHECKS

NATIONWIDE & CANADA

**800-729-4373**

E-MAIL SALES@hamstation.com

LOCAL INFORMATION

**812-422-0231**

FAX 812-422-4253

WWW PAGE <http://www.hamstation.com>

# RT Systems

## Amateur Radio Supply

1-800-723-6922

YAESU

World's Smallest Dual Band HT w/ extended Receive!

VX-1R



FT-50RD

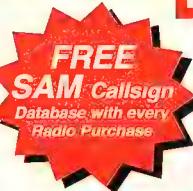


Dual Band Handheld with FTT-12 Keypad



FT-8100R  
FM Dual Bander

ADMS YAESU Radio Computer Programming Software for Mobiles & Handhelds



FT-920



HF All Mode Transceiver



ROTORS

Manufacturer's Day • December 6th • Call for Special Prices!!!

KENWOOD

TS-570D/S with 6 meters

NEW!



HF All Mode

TM-V7A



HF Dual Bander

TH-G71

ICOM

Very Wide Receive!  
including 800MHz  
(cell blocked)

IC-2710H



IC-706MKII



HF, 6M, 2M



IC-32A

Very Wide Receive!  
including 800MHz  
(cell blocked)

1-800-723-6922 • 8207 Stephanie Dr., Huntsville, AL 35802

Store hours: 9-6 Mon.-Fri. • 9-2 Sat. Central

e-mail: sales@rtsars.com web: www.rtsars.com



# EXTREMES

Vs.

## One size fits all

Here's the long and short of it:  
If you want **BIG** for your rig, we've got  
your antenna; if **small** is your call, we've got  
your antenna.

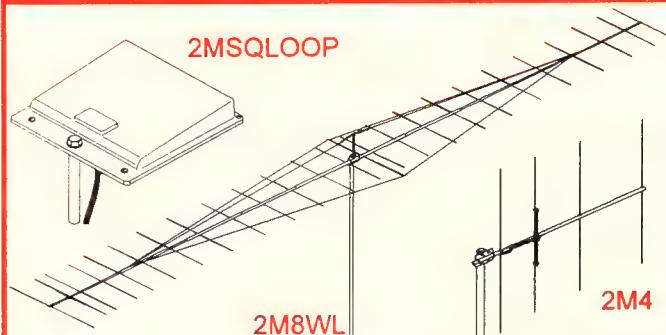
Big? Try our **2M8WL** (24 elements on an 8 wavelength, 53 ft. boom), or the **432-13WLA** (13 wavelength, 31 ft boom) - they just don't come any bigger! Kickin' gain, long booms, and single antenna simplicity are an **M<sup>2</sup>** tradition you may want to join.

Bigger? We still make stacking frames and phasing harnesses. Maybe you'd like to put up **more** than one 2M8WL. Or perhaps an array of 2 or 4 smaller antennas would be better at your QTH. Either way, **M<sup>2</sup>** can help you configure the ideal array - its easier than you may think.

Did you ask for small? At **M<sup>2</sup>**, good things **do** come in small packages. Like our full-band **2M4** yagi on a 4 foot boom - ideal for FM, SSB, and small enough for an attic! Smaller? How about the 9" square **2MSQLOOP**? Omnidirectional, horizontally polarized, and up to 4.8 dB more gain than a vertical.

Big, small, or medium, they all share **M<sup>2</sup>** quality construction: stainless hardware, space-age weather-proofing, and illustrated, no-hassle assembly manuals. With over 75 **M<sup>2</sup>** antenna models, the choice is all yours. *Its not a "one size fits all" world.*

See the lineup at our new web site, under  
construction at [HTTP://www.m2inc.com](http://www.m2inc.com)



7560 N. Del Mar Ave., Fresno, CA 93711  
(209) 432-8873 Fax: 432-3059 Em: K6MYC @ AOL.com

M<sup>2</sup>

- Rohn distributor
- Turnkey systems

AmEx





38th ANNUAL  
**TROPICAL HAMBOREE®  
& ARRL FLORIDA STATE  
CONVENTION**



E-MAIL: [edg@elink.net](mailto:edg@elink.net)

**FEBRUARY 7 - 8, 1998**

TALK IN: 146.925

**DADE COUNTY FAIR & EXPOSITION CENTER**

S.W. 112 AVENUE & CORAL WAY (S.W. 24 ST.)  
MIAMI, FLORIDA

- Sponsored by Dade Radio Club of Miami, Inc.

**ON-SITE EARLY-BIRD EVENTS**

**FEBRUARY 5** – NOVICE/TECHNICIAN EXAM THEORY REVIEW BY GORDON WEST  
WITH LIVE DEMONSTRATIONS AND WORKING EQUIPMENT  
9:00 A.M. - 5:00 P.M. (One Hour Lunch Break) \$25.00

FIVE WPM CODE TEST PREPARATION REVIEW – 6 P.M. - 9 P.M. – \$10.00

**FEBRUARY 6** – GENERAL TEST CODE AND THEORY REVIEW BY GORDON WEST  
9:00 A.M. - 5:00 P.M. (One Hour Lunch Break) \$25.00

These will be Mr. West's only Southeast Coast classes, so sign up now and begin your home-study with ARRL or West materials. Contact Hamboree Chairman for full details.

**FEBRUARY 6 – ARRL RF SAFETY WORKSHOP** by Ed Hare W1RFI, ARRL Laboratory Supervisor  
\$20.00 ARRL Members, \$25.00 Non-Members. Sign up with ARRL Education Dept., 225 Main St. Newington, CT 06111

**FEBRUARY 7 - 8**

- RFI PRESENTATION • INTRODUCTION TO AMATEUR RADIO DISPLAY • LEGAL & FREQUENCY CHALLENGES
- AMATEUR RADIO FOR THE HANDICAPPED • APRS • VHF TRANSMITTER HUNT • YOUTH FORUM
- PROGRAMS BY AMSAT, ARRL, DXPEDITIONS, AND MORE • COMMERCIAL EXHIBITS • THREE SWAP AREAS
- TWO ON-SITE EXAM SESSIONS • FIELD CHECKING FOR DXCC AND CQ AWARDS • NEW CRAFT SECTION & ALTERNATIVE INTEREST PROGRAMS

AIR-CONDITIONED FACILITY • ON-SITE CAMPING FOR 300 RVs • FREE PARKING FOR 15,000 VEHICLES  
• ATM IN MAIN BUILDING • WHEELCHAIR & STROLLER RENTALS • ADDITIONAL REFRESHMENT AREAS

Registration: \$5.00 Advance (deadline Feb. 3) – Door: \$7.00  
Campsites: 3 days (Fri., Sat., Sun.) \$45.00 • 4 days (Thur., Fri., Sat., Sun.) \$60.00  
Swap Tables: \$28.00 each\* plus reg, ticket • Power: \$10.00 per user.

**HEADQUARTERS HOTELS: (All at same location/facilities & rates to meet your needs)**  
1201 N.W. LeJuene Road (N.W. 42nd Avenue)

**MIAMI AIRPORT MARRIOTT:** \$140 single, double - plus tax – Tel: 800-228-9290

**COURTYARD AIRPORT SOUTH:** \$105 single, double - plus tax – Tel: 800-321-2211

**AIRPORT FAIRFIELD INN SOUTH:** \$72 single, double - plus tax – Tel: 800-228-2800

Mention "Tropical Hamboree" Cutoff date is January 22, 1998

**TICKET, CAMP, TABLE PAYMENTS PAYABLE TO: DADE RADIO CLUB OF MIAMI, INC.**

Mail to: Evelyn Gauzens, W4WYR, 2780 N.W. 3 St., Miami, FL 33125-5059

**BOOTH & TABLE INQUIRIES:** email: [edg@elink.net](mailto:edg@elink.net), Tel: 305-642-4139, Fax: 305-642-1648

Homepage: [www.hamboree.org](http://www.hamboree.org)

# Log-EQF

THE EASY TO USE  
LOGGING SOFTWARE.

*Log-EQF Version 8* works with all major callsign databases, computer-ready rigs, and TNC's. DXCC, WAS, beam headings, CW keyer, QSL labels, PacketCluster™, and more.

*Log-EQF Version 8* runs in DOS, OS/2, or Windows. Just \$39.95 (DX add \$3 shipping).

Internet: <http://www.itis.net/eqf>

E-Mail: [n3eqf@usa.net](mailto:n3eqf@usa.net)

Check, Money Order, EQF Software  
VISA or MC Orders: Tom Dandrea, N3EQF  
396 Sauter Drive  
Coraopolis, PA 15108  
1-412-457-2584

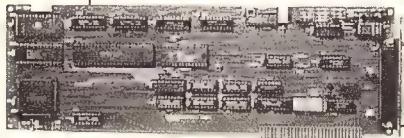
## Comm-Pute, Inc.

**Kenwood, Yaesu, Icom,  
Cushcraft, AEA, Kantronics,  
Bencher, Diamond, Astron,  
MFJ, Hustler, Ameritron,  
Larsen, ARRL, and more...**  
**(800) 942-8873**

Authorized Service For All Major Brands  
HF, VHF, UHF And Accessories

**Local or FAX (801) 567-9494**  
7946 South State Street Midvale, UT 84047  
Closed Mondays

**Motron** 310 Garfield St Suite 4  
PO Box 2748  
ELECTRONICS Eugene, Oregon 97402  
<http://www.motron.com>



### TxID-1

TRANSMITTER FINGERPRINTING SYSTEM  
Our exclusive TxID™ Software and the patented technology of the TxID-1 IBM/Compatible circuit board can help you identify the abusers on your repeater! CTCSS, DCS and DTMF decoding, as well as Deviation measurements and Spectrum Occupancy features further enhance the system.

Now Shipping Version 2 Software with AUTOMATIC MATCH AND COMPARE!

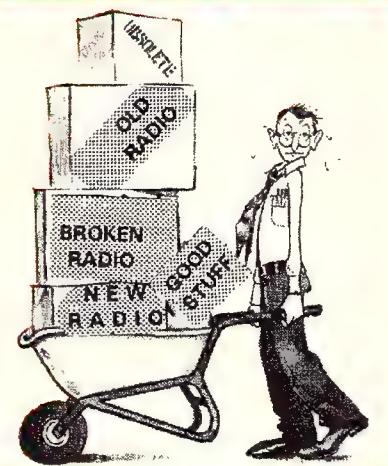
### TxID™ TxPorter™

EXTERNAL ADAPTER FOR MOBILE OPERATION.  
CONNECTS THE TxID TO YOUR LAPTOP COMPUTER!

**TxID-1 FingerPrinting System \$699.00** Plus  
**TxPorter™ Mobile Adapter \$249.00** S/H

Call or write for more information.  
Info: (541) 687-2118 Fax: (541) 687-2492

## NEED SOME HELP WITH THAT?



## DONATE YOUR RADIO

Turn your excess Ham  
Radios and related items  
into a tax break for you  
and learning tool for  
kids.

Donate your radio or related  
gear to an IRS approved  
501 (c)(3) charity. Get the tax  
credit and help a worthy cause

Equipment picked up  
anywhere or shipping  
arranged. Radios you can  
write off - kids you can't.

**Call (516) 674-4072  
FAX (516) 674-9600  
[crew@wb2jkj.org](mailto:crew@wb2jkj.org)  
<http://www.wb2jkj.org>**

**WB2JKJ**

THE RADIO CLUB OF  
JUNIOR HIGH SCHOOL 22  
P.O. Box 1052  
New York, NY 10002

*Bringing Communication to Education Since 1980*

FOR SALE OR SWAP or highest cash offer for Cased Colts, Henry and Volcanic rifles, and early Winchesters: Collins KWS1 and 75A4. W2MCA, 516-285-9258 after 7pm.

FOR SALE: Used technical books, radio, communications magazines. \$1 for large list: tubes, new/used, tested. LSASE, Software Communications, N8EA, 1515 Sashabaw, Ortonville, MI 48462.

FREE DISK CATALOG of Ham Radio and other IBM shareware programs and CD-ROMS. Specify disk size. MOM 'N' POP'S SOFTWARE, P.O. Box 15003-HA, Springhill, FL 34609-0111. 352-688-9108. momnpop@gate.net

FREE Ham Gospel Tracts; youth leaders needed for national outreach. SASE, W1REZ, P.O. Box 8, Harmony, ME 04942.

FREE: Ham Radio Gospel Tracts, SASE. N3FTT, 5133 Gramercy Dr., Clifton Hts., PA 19018.

**GREAT FUN IN THE HAM TRADITION!** Build your own computer! Save money! Three categories and price ranges to choose from: Bare bones. Medium. High tech. No soldering. We supply all you need except the screwdriver and with our guide sheet, it is easy. You can order the kits with or without the monitor. You can order the bare bones kit and add to it or build the high tech kit with all the goodies and blazing speed. J.P., AC4OD, P.O. Box 540633, Lake Worth, FL 33454. 561-965-7491.

HALLCRAFTERS Service Manuals. Amateur and SWL. Write for prices. Specify model numbers desired. Ardco Electronics, P.O. Box 95, Dept. Q, Berwyn, IL 60402.

HAM CLIPART CD for QSLs, newsletters, web sites. CD also includes US callbook, HAM programs, info files, much more. Send \$19.95 to N7LN HAMWARE, PO Box 454, Lehi, UT 84043. <http://www.qsl.net/n7ln>, [n7ln@qsl.net](http://n7ln@qsl.net)

HAM RADIO BOOKS, videos, software. Save on all! FREE CATALOG. A few available - 1996 ARRL Handbooks (List \$38) Only \$19. QRZ! Ham Radio CD-ROM (List \$29.95) Only \$18. 1998 ARRL Handbooks (List \$32) Only \$29.50. 1998 CALLBOOK CD-ROM (List \$49.95) Only \$39. Only 40¢ handling per order plus actual shipping. MasterCard/Visa/American Express/Discover. Worldwide service. JWO SERVICES, 12 Hickory Place, Camp Hill, PA 17011; Open 3-10 p.m. Eastern. Catalog now on Internet: [www.jwoservices.com](http://www.jwoservices.com) E-Mail: [johnw3is@igateway.com](mailto:johnw3is@igateway.com) Phone 717-731-4747; Fax 717-730-9373.

HAM TRADER YELLOW SHEETS. Number one place to buy, sell, trade ham radio equipment for the last 35 years. Published twice a month—mailed first class. Ad deadline one week prior to mailing, which assures quick results. One year subscription (24 issues) \$18. P.O.B. 2057, Glen Ellyn, IL 60138-2057 or P.O.B. 15142, Seattle, WA 98115. For sample copy send #10 self-addressed envelope. E-mail: Internet: [HTYS@aol.com](mailto:HTYS@aol.com)

HAM TV FUN, see what you've missed! <http://stevens.com/avq/>

HAM & TWO WAY RADIO REPAIR: prompt service, competitive prices, AUTHORIZED KENWOOD SERVICE CENTER, Centurion Communications, 892 N. Delsea Drive, Vineland, NJ 08360. 609-794-8000, FAX 609-794-8989.

HAPPY HOLIDAYS to all from DB and Paul. W4UDQ and W4HHK, P.O. Box 73, Collierville, TN 38027. See you on 13 CM EME, 2304.025 for randoms.

HEATH unassembled kit IM5228 VTVM w/book \$50. New Heath HWA 2036-3 PS, 13.8 volts, 2.7 amps 110/220 w/ book \$45. Heath HM-15 SWR meter \$20. Pierre, N6GO, 702-564-5311.

HEATHKIT AMATEUR RADIO REPAIR by RTO Electronics, 5585 Hochberger, Eau Claire, MI 49111. 616-461-3057.

HEATHKIT HD-1410 electronic keyer w/manual. FB condition. \$65, UPS incl. N4VZD, 704-687-9303 or [donnovy@aol.com](mailto:donnovy@aol.com)

HEATHKITS WANTED: Top dollar paid for unassembled kits. Michael Seedman, 847-831-8823 eve., or [mseedman@interaccess.com](mailto:mseedman@interaccess.com)

HEATHKITS WANTED: Transceiver kits and accessories in original unbuilt condition. Rob, W3DX, 804-971-6812 evenings or [Robcap@AOL.com](mailto:Robcap@AOL.com)

HEATHKITS WANTED: Unassembled kits, catalogs, manuals and older gear. Bill, WA8CDU, 616-375-7978. [billrobb@net-link.net](mailto:billrobb@net-link.net)

HF AMP KITS, 2SC2879, 1.8-30MHz, 14VDC, 500W-\$250, KW-\$500. SASE, Lee, KD4YBC, 197 Chickasaw Lane, Myrtle Beach, SC 29577. <http://users.aol.com/relectron/rflect.htm>

HY-POWER ANTENNA 82 feet long 160 meters \$53, 124 feet long three band 40-75-160 meters \$85, 44 feet dual band 20-40 meters \$59, lots more. SASE, 2028 Riverside Drive, Bethlehem, PA 18015.

# MCM ELECTRONICS®

The comprehensive resource for all your electronics needs!



Look to MCM Electronics for outstanding values in 2M and 70cm accessories including amplifiers, antennas, duplexers, microphones and power supplies.

Call For Your FREE CATALOG  
**1-800-543-4330**  
[www.mcmelectronics.com](http://www.mcmelectronics.com)



Same Day Shipping!  
In stock orders  
received by 5:00 p.m.  
(YOUR TIME)  
are shipped the  
same day!



**MCM ELECTRONICS®**  
650 CONGRESS PARK DR.  
CENTERVILLE, OH 45459  
A PREMIER FARRELL Company

CODE:  
QST15

## MOSLEY .... "A Better Antenna!"

M.E.I.

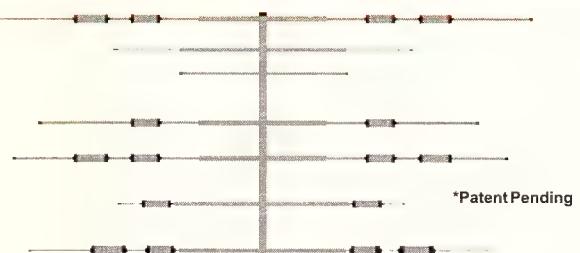
The **NEW PRO-67-C** is the ULTIMATE in a 24' boom antenna. Not too big, but large enough to handle the biggest of pile-ups.

This **SEVEN BAND** beauty is the antenna you have been looking for to handle all your operating requirements.

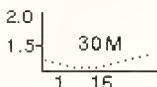
The PRO-67-C, now has **3** elements on **40** 1 element on **30** 3 elements on **20** 3 elements on **17**, 3 elements on **15** 3 elements on **12** and a **4** element **10** meter beam **ALL IN ONE** using a single feed line. This antenna is **HOT**

The construction is in the MOSLEY tradition of heavy wall thickness, precision fit, and of course, all STAINLESS STEEL hardware and U-Bolts, as it has always been. The gain, bandwidth, and power capabilities of this antenna is truly amazing.

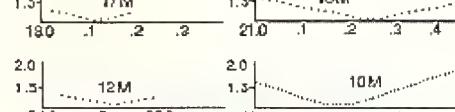
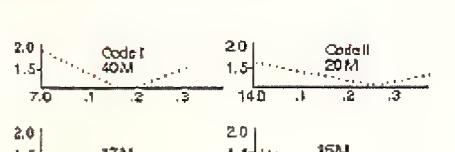
Remember, "The joy of low price is soon forgotten after the high price of poor quality!" You deserve the very best! You deserve a **MOSLEY, "A BETTER ANTENNA!"**



Also has **30 Meters!**



**Sale Price:**  
PRO-67-C-3\*  
**\$1,458.95**



**50 Plus Years of Tradition, and Innovations!**

\* Prices and specifications are subject to change without notice or obligation  
Sale price does not include shipping, handling or insurance

Band	Gain	E/B	No. of Elem. per Band
40 M	3		
30 M	1		
20 M	3		
17 M	3		
15 M	3		
12 M	3		
10 M	4		
Write or Call for our current catalog on other Mosley quality antennas. For any help or information concerning an antenna write or call the Mosley Engineering Department. We will be glad to discuss your situation with you.			

Mosley Electronics, Inc., 10812 Ambassador Blvd., St. Louis MO 63132  
Eng. (314)-994-7872 Fax. (314)-994-7873 Sales (800)-325-4016 or (800)-9-MOSLEY

## INTERNATIONAL ANTENNA CORP. DOUBLE BAZOOKA ANTENNAS

The ultimate in high performance dipole antennas. Broadband performance with SWR <2:1 across entire band. Constructed of MIL-SPEC components & assembly procedures. Totally sealed from all weather environments. Extremely quiet plus 98% efficient even at 2KW's plus.



SINGLE ANTENNA PRICE	
40 Meters	\$120
80 Meters	\$140
160 Meters	\$200

AMERICAN EXPRESS MASTERCARD VISA

DOUBLE BAZOOKAS AVAILABLE IN A PHASED ARRAY  
A two element phased array produces substantial gain over a single antenna

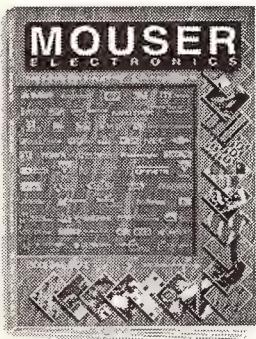
Contact IAC for prices.



4841 Fayann Street: Orlando Florida 32812  
407-380-6270 (phone/fax) [www.iacantennas.com](http://www.iacantennas.com)

## ELECTRONIC COMPONENTS

Call for  
your  
**FREE**  
364  
page  
catalog  
TODAY!



- 69,000 Products
- 135 Manufacturers
- Same Day Shipping
- No Minimum Order

**800-992-9943**

817-483-6828 Fax: 817-483-0931  
[www.mouser.com](http://www.mouser.com) [catalog@mouser.com](mailto:catalog@mouser.com)  
958 North Main St., Mansfield, TX 76063



1000  
Full Color  
QSL Cards  
only \$149.00  
Actual Size  
3 1/2 x 5 1/2



**Free!**

Color Type  
on Front Side  
Send for Info. Kit  
& Price List to:

Pixel Graphics

**X-PRESSIONS**

11184 Antioch Rd. - #399 • Overland Park, KS 66210  
or call Toll Free 1-800-466-1616

## • WIRE/CABLE

Commercial/ham/marine, insulators, baluns, lead line, "BURY-FLEX"™ LOW LOSS flex/bury cable \$59/ft. (Why pay more for flex LMR?) "FLEX-WEAVE"™ hybrid, "Cadillac" aerial wire, 168 strand cop., bare or U.V. PVC. \$14/ft. avg. "CQ Flexi 4XL," \$58/ft.

## • ROPE ROPE ROPE

ANTENNA/TOWER SUPPORTS: **WHY RISK COSTLY FAILURES?** DACRON DOUBLE braided: \$30/11.16 for 3/32", 3/16", 5/16", 1,000 ft. discounts.

## • DSP AUDIO FILTERS

FINALLY HEAR WEAK SIGNALS! Full satisfaction guarantee. NIR-12: \$318.00.

ANC-4 (local elect. noise elim.): \$169.95.

FRIENDLY, FAST SERVICE! Dealer inquiries invited!  
Lower prices = poor results, quicker replacement.

DAVIS RF CO.

PO BOX 730-A  
CARLISLE, MA 01741



A DIVISION OF Davis Associates

24 HOUR ORDERS:

**1-800-328-4773**

TECH/INFO:

**1-978-369-1738**

<http://www.cominternet.com/davisrf>

E-mail: [davisrfinc@aol.com](mailto:davisrfinc@aol.com)  
(Commercial wire/cable  
please call our 800 #)

## GORDON WEST

HAM TEST PREP TAPES  
BOOKS • SOFTWARE • VIDEOS

Prepare for your ham test with "Gordo" WB6NOA as your personal instructor.

- **THE THEORY** on audio cassettes  
No-Code Technician (4 tapes)..... \$19.95  
General Class (2 tapes)..... \$ 9.95  
Advanced Class (4 tapes)..... \$19.95  
Amateur Extra Class (4 tapes)..... \$19.95
- **THE CODE** on audio cassettes  
Learning CW (6 tapes)..... \$29.95  
General Class CW (6 tapes)..... \$29.95  
Extra Class CW (6 tapes)..... \$29.95
- **STUDY MANUALS** by "Gordo"  
No-Code Technician (2&3A)..... \$12.95  
General Class (3B)..... \$ 9.95  
Advanced Class (4A)..... \$11.95  
Extra Class (4B)..... \$11.95
- **IBM SOFTWARE** with manual  
No-Code Technician (2&3A)..... \$29.95  
General Class (3B + Code)..... \$29.95  
Advanced Class (4A + Code)..... \$29.95  
Extra Class (4B + Code)..... \$29.95  
Morse Software Only..... \$ 9.95
- **VIDEO** VHS with 2&3A manual  
No-Code Tech Video Course..... \$29.95

Add \$3.00 shipping charge - 3 day service  
VISA, MasterCard, Discover & AMEX Accepted

## The W5YI Group, Inc.

P. O. Box 565101 • Dallas, TX 75356

Call Toll Free **1-800-669-9594**

## FROSTFEST '98

RICHMOND, VA AMATEUR  
RADIO & COMPUTER SHOW  
SUN JAN 18th 8:30AM-3:30 PM



### Richmond Amateur Telecommunications Society

The Showplace-3000 Mechanicsville Tpk.

Hourly Prizes • Forums • Talk-in 146.88  
INDOOR DEALERS & FLEA MARKET

Tickets & Tables before Jan. 3rd only

Todd or Amy McCoy (804) 330-3165

P.O. Box 35021 Richmond, VA 23235-0021

Info Line (804) 739-2269 box FEST

Internet: <http://frostfest.rats.net>

IC-737A mint, IC-2KL V.G., AT-500 FB. All boxes, manuals, accs. Sold as one unit. \$2,150. Joel, N8WEE, 616-451-8791.

ICOM 271A all mode VHF 25W. Serviced by Icom Bellevue, looks new, one owner, \$400. 360-698-7846. K7OM@prodigy.net

ICOM 765 with SM5 mic, mint condition. \$1,550 pre-paid USA. Dick, KA1SM, phone/fax 912-598-7252, e-mail: [clancey2@juno.com](mailto:clancey2@juno.com)

INTERESTED in viewing the earth from space? Subscribe to *Weather Satellite Report*. Since 1992 the international quarterly of earth and atmospheric imagery. Woodhouse Communication, 616-226-8873, fax 616-226-9073, web site: [www.view2earth.com](http://www.view2earth.com)

KENWOOD FACTORY AUTHORIZED SERVICE: Warranty, non-warranty. Repair most brands. Groton Electronics, 508-448-3322. <http://www.ultranet.com/-jacques>

KENWOOD TS-130SE with PS30 power supply \$360. Kenwood TS-520S with AT-200, \$380, shipped. KK5GP, 505-836-3288.

KENWOOD TS-520SE \$350. Drake TR4C/AC4 \$350. K1BW, 413-538-7861.

KENWOOD TS-570D transceiver with 500 hertz CW filter. New in box. \$1175. Doug, KG8JT, 937-335-1300.

LEARN CODE by Hypnosis, <http://www.qth.com/cweasy/> or 800-425-2552.

MODEL NBP2.4, Precision, 2.4 GHz, low phase error, narrow band pass filters \$148 each or best offer, quantity available 2525. Fax P.O. or requests for information to AMR-LORAN at 609-764-1643.

MORSE 0-20 WPM 90 days guaranteed! Codemaster V for IBM compatible PC \$29.95. Milestone Technologies, 800-238-8205. <http://www.mtechnologies.com/mthome>

MOSLEY CL-33, Ham-II rotor, Tristao MM-40 mini tower, very good condition. All for \$500. You pickup. WB5OCL, 281-497-5685 after 6 p.m.

NEAT & WAYOUT ELECTRONIC STUFF!  
[WWW.GATEWAYELEX.COM](http://WWW.GATEWAYELEX.COM)

NEW PRODUCTS FROM S&S: Upgrade your old rigs! Digital dial (counter) has 10 Hz resolution HF, 100 Hz VHF and frequency range 50 kHz to 230 MHz; kit \$99.95; assembled \$149.95. NEW Digital VFO with 1 Hz resolution to 54 MHz; kit \$169.95; assembled \$219.95. S&H \$7.00 (Continental US). GUARANTEED TO WORK. For info send SASE; Call/write to order: S&S Engineering, 14102 Brown Road, Smithsburg, MD 21783. 301-416-0661. E-mail: [NSSAD@aol.com](mailto:NSSAD@aol.com) or see <http://www.xmetric.com/sseng>

NOW ON 40 METERS! NEW, KNOB TUNED w/DIGITAL DISPLAY, SYNTHESIZED qrp Transceiver. Complete kit only \$199.95. S&H \$10 (Continental US). GUARANTEED TO WORK. For info send SASE; Call/write to order: S&S Engineering, 14102 Brown Road, Smithsburg, MD 21783. 301-416-0661. E-mail: [NSSAD@aol.com](mailto:NSSAD@aol.com) or see <http://www.xmetric.com/sseng>

PADDLETTETM: miniature (1" x 1 3/4"), iambic paddle key and knee mount- total 3 ounces. Rugged, reliable, ideal for mobile, backpackers- see page 34, July '97 QST. Price \$44.95; key only, \$38.50, shipping included. Send check or money order to Paddlette Co., P.O. Box 6036, Edmonds, WA 98026. K1VYV, 425-743-1429.

PEP CONVERTER Kit! Will convert averaging wattmeters to read voice peaks! (Bird 43 tool) \$19.99 ppd. Hi-Res Communications, 8232 Woodview, Clarkston, MI 48348-4058. 810-391-6660.

PLEASE, check out: <http://www.GLR.com/dwm>

"PR" CRYSTALS Peterson Radio Co., Inc., 2735 Avenue A, Council Bluffs, IA 51501, 712-323-7539.

PRINTED CIRCUIT BOARDS for Amateur Radio projects. Internet: [www.cl.ais.net/farcr](http://www.cl.ais.net/farcr). E-mail: [farcir@ais.net](mailto:farcir@ais.net). List SASE. FAR Circuits, 18N640 Field Ct., Dundee, IL 60118.

QST ISSUES WANTED: January, September and December 1980, also June 1981. Issues must be in excellent condition. Bob, WD4OHD, 423-843-2160.

QSTs (pre-1923) wanted. VE3CUI.

R390A RECEIVERS. Parts and decks for sale. George, K1ANX, 413-527-4304.

RADIO REPAIR! All makes, most models. Western Amateur Radio Repair Co., W7DDF (ex-AB7DR), 998 Whipple Grayland, WA 98547-0697. 360-267-4011.

RC-740X, band expansion for Kenwood 741/742 series. ScannerWEAR WINDOWS software for Icom, AOR, Opto receivers. R.C.S.I., M-F 9-4 PTT, 800-560-7234. See all at <http://www.radioscans.com>

REPEATERS: Motorola Micors, 440 and 2-meter, 45-65W, \$400. 440 Duplexers \$250-\$450. On your frequency and guaranteed. Matt Bush, 941-694-5911.

# INTERMOD SOLUTIONS from DCI

## What is Intermod?

Intermod is the common name for the interference we hear from other transmitters such as pagers, police and taxis. It stands for Intermodulation Distortion and occurs when the RF amplifier in your receiver is driven non-linear by a strong signal. Two or more signals then mix in your receiver's RF amplifier and create a signal on your listening frequency.

## Here's what a DCI Filter can do for YOU!

A handheld radio usually operates properly with a rubber duck antenna, but when it is connected to a mobile or base antenna, the HT becomes susceptible to intermod. This happens because some of the signals become strong enough to drive the RF amplifier non-linear. DCI filters allow you to benefit from the gain of a high performance antenna without creating an intermod problem.

Mobile radios have better intermod immunity than handhelds, but if the signals are strong enough, mobiles too will be susceptible to intermod. Whether or not this happens depends on the radio, and the strength and frequency of the signals. Some metropolitan areas have so many strong signals that most VHF/UHF amateur transceivers experience intermod. The DCI filters are very effective in reducing intermod in high RF environments.



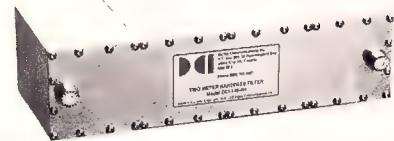
In many situations, a DCI filter will increase the sensitivity of a base station or repeater, particularly when using a low-noise preamp. The increase occurs because the DCI filter reduces the strength of both background noise and out-of-band signals. The result is less intermod-generated noise on your active frequency.

**DCI bandpass filters** are first-class filters with first-class specifications. They reduce the strength of interfering signals while allowing the signals you want to hear to pass through at virtually full strength. They're a worthwhile addition to any mobile, base station or repeater.

### Features and Benefits

- Eliminate the random squeals, squawks, beeps, and strange voices from your VHF or UHF radio.
- Improve receiver sensitivity
- Hear the signals you want to hear, even in crowded urban centers with strong police and paging systems
- Filters are totally passive and do not require DC power
- Filters accept full transmitter power and reduce spurious emissions
- Made with high quality silver-teflon connectors
- Made of extruded aluminum, copper and brass - no components inside to burn out or fail

**DCI DIGITAL COMMUNICATIONS INC.** Box 293, 29 Hummingbird Bay, White City, SK, Canada SOG 5B0 <http://www.dci.ca> email: [dci@dci.ca](mailto:dci@dci.ca)



HIGH QUALITY, LOW LOSS, PASSIVE BANDPASS FILTERS



### For Amateurs:

In stock at most ham radio stores.

### (NEW! Filters for VSB and 6 meters)

144-146 MHz	for weak signal or satellite work, or for European-Asian 2m ham band	\$89
144-148 MHz	full 4 MHz wide filter for 2m ham band	89
222-225 MHz	for links and reducing Ch. 13 intermod	89
430-440 MHz	for weak signal or satellite work, or for European-Asian 70cm ham band	109
440-450 MHz	for repeater and FM simplex voice communications	109

### For Commercial Users:

130 to 160 MHz, 400 MHz, 900 MHz and PCS filters for 1.9 GHz. Custom-tuned to your individual requirements.

**Phone our technical staff at no charge for expert advice on your intermod problem.**

Direct (306) 781-4451 • Fax (306) 781-2008

Toll-Free 1-800-563-5351



# CABLE X-PERTS, INC.



### COAX (500MHZ "LOW LOSS" GROUP)

	100FT/UP	500FT	1000FT
"FLEXIBLE" 9913 STRD BC CNTR FOIL + 95% BRAID 2.7dB @ 400MHz NC/DB/UV JKT.....	.58/FT	.56/FT	.54/FT
9913 "EQUAL" SOLID BC CNTR FOIL + 95% BRAID 2.7 dB @ 400MHz UV JKT.....	.43/FT	.41/FT	.39/FT
LMR 400 SOLID CCA CNTR FOIL + BRAID 2.7dB @ 450MHz WP/UV JKT.....	.59/FT	.57/FT	.55/FT
LMR 400 "ULTRA-FLEX" STRD BC CNTR FOIL + BRAID 3.1dB @ 450 MHz TPE JKT.....	.79/FT	.78/FT	.77/FT
LMR 600 (OD.590") SOLID CCA CNTR FOIL + BRAID 1.72dB @ 450 MHz WP/UV JKT.....	.125/FT	.122/FT	.120/FT
LDF4-50A 1/2" "ANDREWS HELIX" 1.51dB @ 450MHz.....	.25FT/UP	.21.0/FT	

### COAX (50 OHM "HF" GROUP)

	100FT/UP	500FT	1000FT
RG213/U STRD BC MIL-SPEC NC/DB/UV JACKET 1.2 dB/2500WATTS @ 30MHz.....	.36/FT	.34/FT	.32/FT
RG8/U STRD BC FOAM 95% BRAID UV RESISTANT JKT 0.9dB/1350WATTS @ 30MHz.....	.32/FT	.30/FT	.28/FT
RG8 MINI(X)95% BRAID UV RESISTANT JACKET 2.0dB/875 WATTS @ 30MHz.....	.15/FT	.13/FT	.12/FT
RG58/U 95% BRAID UV RESISTANT JACKET 2.5dB/400 WATTS @ 30MHz.....	.15/FT	.13/FT	.11/FT
RG58A/U STRD CENTER 95% TC BRD UV RESISTANT JKT 2.6dB/350 WATTS @ 30MHz.....	.17/FT	.15/FT	.13/FT

### COAX (50 OHM "TEFLON" GROUP)

	100FT/UP	500FT	1000FT
RG142/U SOLID SCCS 2-95% SILVER BRAIDS TEFLON JKT 8.2dB/1100WATTS @ 400MHz.....	.25FT/UP	.125/FT	
RG303/U SOLID SCCS 1-95% SILVER BRAID TEFLON JKT 8 6dB/1100WATTS @ 400MHz.....	.25FT/UP	.100/FT	

### COAX (75 OHM GROUP)

	100FT/UP	500FT	1000FT
RG11/U SOLID BC (VP-78%) 95% BRAID NC/DB/UV JKT 1.2dB/800WATTS.....	.40/FT	.38/FT	.36/FT
RG11A/U STRD BC (VP-66%) 95% BRAID NC/DB/UV JKT 1.3dB/1000WATTS.....	.42/FT	.40/FT	.38/FT
RG6/U CATV FOAM 18GA CC8 FOIL + 60% ALUM BRAID.....	.18/FT	.16/FT	.14/FT

### LADDER LINE GROUP

	100FT/UP	500FT	1000FT
450 OHM 18GA SOLID CCS (POWER: FULL LEGAL LIMIT)	.12/FT	.10/FT	.09/FT
"FLEXIBLE" 450 OHM 16GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT+)	.18/FT	.17/FT	.16/FT
"FLEXIBLE" 450 OHM 14GA COMPRESSED STRD CCS(PWR-FULL LEGAL LIMIT++)	.25/FT	.24/FT	.23/FT
300 OHM 20GA STRD (POWER: FULL LEGAL LIMIT).....	.15/FT	.13/FT	.12/FT

### ROTOR & CONTROL CABLES

	100FT/UP	500FT	1000FT
5971 8/COND (2/18 6/22) BLK UV RES JKT. Recommended up to 125ft.....	.20/FT	.18/FT	.16/FT
4090 8/COND (2/16 6/20) BLK UV RES JKT. Recommended up to 200ft.....	.35/FT	.34/FT	.32/FT
1418 8/COND (2/14 6/18) BLK UV RES JKT. Recommended up to 300ft.....	.47/FT	.45/FT	.43/FT
1216 8/COND (2/12 6/16) BLK UV RES JKT. Recommended up to 500ft.....	.78/FT	.74/FT	.70/FT
2206 22GA STRD 6/COND PVC JACKET.....	.18/FT	.16/FT	.14/FT
1806 18GA STRD 6/COND PVC JACKET.....	.23/FT	.21/FT	.19/FT

### ANTENNA WIRE (UNINSULATED BARE COPPER)

	100FT/UP	500FT	1000FT
14GA 168 STRD "SUPERFLEX" (great for Quads & Portable set-ups etc.).....	.12/FT	.10/FT	.08/FT
14GA 7 STRD "HARD DRAWN" (perfect for permanent Dipoles etc.).....	.08/FT	.07/FT	.06/FT
14GA SOLID "COPPERWELD" (for long spans etc.).....	.08/FT	.07/FT	.06/FT
14GA SOLID "SOFT DRAWN" (for ground radials etc.).....	.08/FT	.07/FT	.06/FT
ROPE: 3/16" DOUBLE BRAID "DACRON" 770# TEST WEATHERPROOF.....	.12/FT	.09/FT	.08/FT

### TINNED COPPER "FLAT" GROUNDING BRAID

	1 INCH WIDE (equivalent to 7ga).....	.25FT \$22.00.....	.50FT \$43.00.....	.100FT \$85.00.....
1/2 INCH WIDE (equivalent to 10ga).....	.25FT \$12.50.....	.50FT \$24.00.....	.100FT \$48.00.....	

### CONNECTORS

Both connectors fit 9913 types and LMR400

	PL 259 SILVER/TEFLON/GOLD TIP.....	10PC \$11.00.....	.25PC \$25.00.....	.50PC \$47.50.....	.100PC \$90.00.....
"N" (2PC) SILVER/TEFLON/GOLD TIP.....	10PC \$32.50.....	.25PC \$75.00.....	.50PC \$143.75.....	.100PC \$275.00.....	

CABLE & WIRE CUT TO YOUR SPECIFIC LENGTH • WE STOCK AND INSTALL CONNECTORS TOO.

### COAX W/SILVER TEFLON PL259's EA END (soldered & tested)

100FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz.....	65.00/EA
75FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz.....	50.00/EA
50FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz.....	35.00/EA
25FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400MHz.....	20.00/EA
6FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400 MHz.....	10.00/EA
3FT "FLEXIBLE" 9913 FOIL+95% BRAID 2.7dB @ 400 MHz.....	9.00/EA
100FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz.....	45.00/EA
75FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5dB @ 50MHz.....	35.00/EA
50FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz.....	25.00/EA
25FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz.....	16.00/EA
6FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz.....	9.00/EA
3FT RG213/U MIL-SPEC DIRECT BURIAL JKT 1.5 dB @ 50MHz.....	8.00/EA
100FT RG8MINI(X) 95% BRD UV RES JKT 2.5dB @ 50MHz.....	21.00/EA
50FT RG8MINI(X) 95% BRD UV RES JKT 2.5dB @ 50MHz.....	12.95/EA

### FLEXIBLE 2/COND RED/BLK DC POWER "ZIP" CORD

8GA (rated:40 amps).....	.25FT \$16.00.....	.50FT \$31.00.....	.100FT \$60.00.....
10GA (rated:30 amps).....	.25FT \$10.50.....	.50FT \$19.00.....	.100FT \$36.00.....
12GA (rated:20 amps).....	.25FT \$8.00.....	.50FT \$14.00.....	.100FT \$26.00.....
14GA (rated:15 amps).....	.25FT \$6.00.....	.50FT \$10.00.....	.100FT \$18.00.....

Connectors installed (soldered & tested).

### TOTAL PRICE:

**\$84.95**

ON THIS SPECIAL ONLY: Shipping included within the 48 states.

ILLINOIS RESIDENTS ADD 8.25% SALES TAX.

(NO COD'S) (MINIMUM ORDERS: \$20.00)

### ORDERS ONLY:

**800-828-3340**

TECH INFO: 847-520-3003

FAX: 847-520-3444

<http://www.cablexperts.com/>

416 Diens Drive, Wheeling, IL 60090



"JAKE"

(our youngest family member)

ON THIS SPECIAL ONLY: Shipping included within the 48 states.

ILLINOIS RESIDENTS ADD 8.25% SALES TAX.

(NO COD'S) (MINIMUM ORDERS: \$20.00)



here is the next generation Repeater

## MARK 4CR

The only repeaters and controllers with REAL SPEECH!

No other repeaters or controllers match Mark 4 in capability and features. That's why Mark 4 is the performance leader at amateur and commercial repeater sites around the world. Only Mark 4 gives you Message Master™ real speech • voice readout of received signal strength deviation and frequency error • 4-channel receiver voting • clock time announcements and function control • 7-bit call filter receiver • extensive phone patch functions. Unlike others, Mark 4 even includes power supply and a handset/can net.

Call or write for specifications on the repeater controller and receiver winners.

### NEW

RS-232 Option For Repeater Control Using MODEM or PACKET TNC

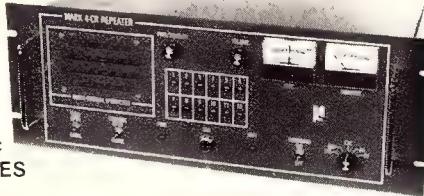
### MICRO CONTROL SPECIALTIES

Division of Kendecom Inc

23 Elm Park, Groveland, MA 01834 (508) 372-3442

E-mail: kendecom@concentric.net

2 meters, 220, and 440!



FAX 508/373-7304

RETIRED MOTOROLA Bench Technician Repairs Ham Gear, all makes new or old. Tom Miller Electronics, K6RXR, The Old Goat, 22515 S. Normandie, SP41B, Torrance, CA 90502, 800-995-8964, 310-320-8980.

**RF TRANSISTORS, TUBES** 2SC2879, 2SC1971, 2SC1972, MRF247, MRF455, MB8719, 2SC1307, 2SC2029, MRF454, 2SC3133, 4CX250B, 12DQ6, K6GA6, etc. WESTGATE, 800-213-4563.

**ROHDE & SCHWARZ** receiver EK070 \$9415. Rohde & Schwarz receiver EK071 \$2815. Rohde & Schwarz directional power meter NAUS4 \$215. Rohde & Schwarz mobile tester SMFP2 \$999. Siemens receiver E401 \$1475. Cubic dual receiver R3030A \$2295. Sony CRF-320 \$530. Sony CRF-V21 \$1659. Sony ICF 2001 \$160. Philips-Magnavox receiver C-11670 \$1940. Icom R71A with PBT \$695. Racal 1772 \$1195. Racal 1220 \$695. National R1490GRR17 \$595. Antenna coupler Sylvania CU1280 \$195. Universal decoder 8000 \$395. Allied SX190 \$175. Century-21 \$95. Collins R389URR \$695. Panasonic RF-220 \$145. HP331A distortion analyzer \$345. HP8405A Vector voltmeter \$300. For more info call V&V Co., tel. 416-421-5800, fax 416-423-7581.

**ROSS** \$\$\$\$ New Specials: Kenwood G-71A \$365, TS-570S \$1650, TMV-7A \$530, TM-742A \$650, TM-411A \$330; MFJ 815B \$58, 752C \$80, 989C \$299, 1264 \$14; Yaesu FT-50R/41B \$346, FT-73RTT \$240, FT-811 \$300, FT-709R \$300, FT-703RTT \$245, FT-8500/MH-39 \$586; Icom 2000H \$246.50, T2A \$154.50, 435 \$260, PS-45 \$145, BP-23 \$25. Call or visit our Web page for complete list and more specials <http://www.rossdist.com>, Phone 208-852-0830. All prices cash, FOB Preston, Ross Distributing Company, 78 South State, Preston, Idaho 83263.

**SALE:** Closing all Kenwood mobile station. TS-130S transceiver, PC-1 phone patch, DFC-230 frequency controller, AT-130 antenna tuner. Total \$600 plus freight. K1VJ, 860-739-7642.

**SELL:** MFJ-784B DSP filter, MFJ Versa tuner II antenna tuner, \$150. Sam, KE2KG, 212-534-5767 after 6PM.

**SELL:** NCL-2000. Collector grade. Spare finals, blower, Viking Ranger I & II. K7KCA, 520-GOD-COKE.

**SELL:** The Big Gun—Henry 3000D amplifier. 5KW input, 3KW output - 3CX300A7 in final (low time good tube), with 3PH PS (only plate xfrm is 3PH) rest is 110/220 1PH. Currently fixed freq. with counters and small range tuning caps. In cabinet 4.5 ft. high, 450#. \$900 plus shipping (est \$200). Dan, 505-269-2056 cell or wk: 505-883-6250.

**SHACK ATTACK**, ham accessories, CD-ROMs: 435-878-2760, kb7rvd@aol.com, [www.vcnet.com/sa](http://www.vcnet.com/sa)

**SHORT Dipoles** by G5RV and W1JC. SASE. Tom Evans, 113 Stratton Brook, Simsbury, CT 06070. 860-658-5579. <http://pages.prodigy.com/w1jc>

**STOLEN** with 2 duplicate keys out of a private apartment in West-Germany these items of a radio collector: (1) transistor radios: (1960-1970) 3 Schaub-Lorenz T 20, T 40, T 50; 2 Russian VF 601; 1 Saba. (2) German and English vintage wireless literature. Each item engraved or stamped "W.B.", "W.Brox", "Oberursel"! Necessary 10 days to restore each radio! Reward for returning the property and for proofs about the producers of duplicate keys! Mr. W. Brox, P.O. Box 110302, 60038 FRANKFURT/M, West-Germany.

**SUPERFAST MORSE CODE SUPEREASY**. Free catalog: SASE. Bahr-Q6, 150 Greenfield, Bloomingdale, IL 60108.

**SX88 HALLCRAFTERS** receiver wanted. Jim, W6OU, 714-528-5652.

**TELEGRAPH KEYS** wanted by collector. Bugs and unusual or unique straight keys or sounders, and tube electronic keyers. Also pre1950 callbooks. Vince Thompson, K5VT, 3410 N. 4th Ave., Phoenix, AZ 85013. 800-840-KEYS.

**THRUST BEARINGS** for 2 inch tubing, two hole mounting, heavy duty, American made, new, sealed, with Zirk fitting. \$60 ea. Hal, K6GWN, 562-944-2325.

**TICK KEYERS!** TiCK-2 chip \$10, kit \$21 ppd. Send SASE for more info. Embedded Research, PO Box 92492, Rochester NY 14692. <http://www.frontiernet.net/~embres> Email: [embres@frontiernet.net](mailto:embres@frontiernet.net)

**TRI-EX "SKY-NEEDLE"** (TM5100RC) with all accessories. Top 32' (of 100') rotates; prop-pitch rotator. Like new! \$15,000. I create, u-ship. KLM 20M monobander on 59' boom, 6 EL., new, in box, unused! \$550. U-ship. Collins 208U-10 "auto-tune" xmitter, \$6,000. The 200' "CLEMENTOWER," a rotating tower made of ten T-26 sections (by Tri-Ex) 200' high, (turning in rings) \$10,000. U-ship. (Will easily rotate "stacked" 75 meter Yagis)! Three, 25 amp "Varicaps," on single shaft (for 30) \$1,000 (by General Radio) type W50H. U-ship. The 36 EL., "Super 20M Rotary-Array," shown on the front cover of QST, June, 1980, now for sale. Call A.J.F. Clement, tel: 805-392-9323, fax: 805-399-5411.

**TRI-EX W-51** tower for sale with new RCB-37 base, all manuals, accessories. Al, W9WJ, 708-246-4741 evenings.

## Gladiator High Performance One-Bander DX Verticals

**Top or Center Loaded One-Banders for 160 and 80 Meters. Full Size 40, 30, 20, 15 and 10 M.**

For 80 and 160 M, Top Loaded, 38' tall with top hat wires. No coils. None! Or, try our Center Loaded Gladiators (used at VK0IR, Heard Island) for a lower profile, 33' tall & no top hat wires. Resonant freq. adjustable. Matching network & coax connector included. Very heavy duty, no guts! Optional ground radial systems available or create one yourself. Try our Tuned Inductor short Radial System for 160M (40') or 80M (33'). Full size One Bander DX Gladiators for 40M through 10M. Perfect for 4 Square Parasitic and phased arrays. Note new address & phone number.

**R. Myers Communications, L.L.C.**

New Address: 37875 North 10th St. Phoenix, AZ 85027

New Phone: Call (FAX or Voice): 602-465-0936 VISA/MC

[WWW.primenet.com/~bmyers](http://WWW.primenet.com/~bmyers)

email to Bob Myers, W1XT: [bmyers@primenet.com](mailto:bmyers@primenet.com)

## FREE! ANTENNA & TOWER MOUNT CATALOG

• BG 18 LADDER MAST  
• STANDOFF BRACKETS  
• SO 1  
• SO 2  
• SO 3  
• SO 12 DUO MOUNT  
• SO 13 TRI MOUNT  
• RM 16 ROTOR MOUNT  
• HOT DIPPED GALVANIZED  
• IMMEDIATE UPS SHIPPING  
• CALL OR WRITE:  
IIX EQUIPMENT LTD  
PO BOX 9, OAK LAWN, IL 69454  
708-423-0605 FAX 708-423-1691  
e-mail: [ixx@interaccess.com](mailto:ixx@interaccess.com) <http://www5.interaccess.com/ixxpt>

- DIP switch programmable
- CTCSS encoder
- All 32 EIA tones from 67.0 to 203.5 Hz included
- May be ordered with custom tones



SS-32PA Encoder

.9" x 1.3" x .4"

**SS-32PA DIP Switch Programmable CTCSS Encoder \$28.95**

- Fully enclosed CTCSS encoder
- All 32 EIA tones from 67.0 to 203.5 Hz included
- Perfect for mobile / base applications



TE-32

5.25" x 3.3" x 1.7"

**TE-32 Multi-Tone CTCSS Encoder \$49.95**

- Eight programmable, selectable messages
- Fully field programmable via included keypad
- Meets all FCC identification requirements



NEW LOWER PRICE

\$69.95

**ID-8 Automatic Morse Station Identifier \$89.95**



TP-3200 Shared Repeater Tone Panel

\$269.95 each

TP-3200D Table Top Version

\$279.95 each

TP-3200RM-A Single Rack Mount Version

\$279.95 each

TP-3200RM-B Triple Rack Mount Version

\$279.95 each

\*Holds up to three TP-3200s

Call or write to receive our full Product Catalog or visit our Web site for complete information at:  
<http://www.com-spec.com>

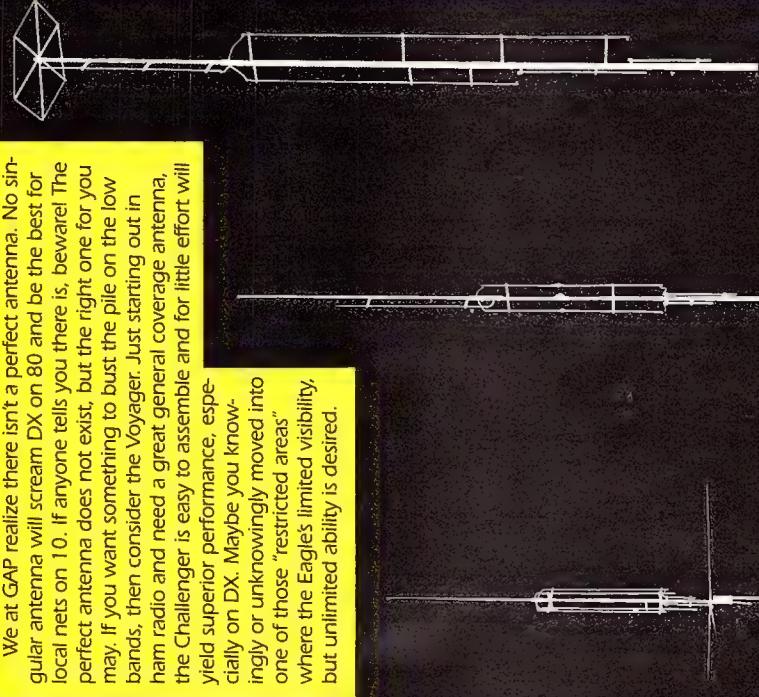


**COMMUNICATIONS SPECIALISTS, INC.**  
426 WEST TAFT AVENUE • ORANGE, CA 92865-4296  
(714) 998-3021 • FAX (714) 974-3420  
<http://www.com-spec.com>

# GAP: THE PERFECT ANTENNA

Latest Release: TITAN DX

We at GAP realize there isn't a perfect antenna. No singular antenna will scream DX on 80 and be the best for local nets on 10. If anyone tells you there is, beware! The perfect antenna does not exist, but the right one for you may. If you want something to bust the pile on the low bands, then consider the Voyager. Just starting out in ham radio and need a great general coverage antenna, the Challenger is easy to assemble and for little effort will yield superior performance, especially on DX. Maybe you knowingly or unknowingly moved into one of those "restricted areas" where the Eagle's limited visibility, but unlimited ability is desired.



Voyager DX

This chart helps you select the right GAP antenna. When comparing GAPs, bandwidth is not a concern. With few exceptions, a GAP yields continuous coverage under 2:1 for the ENTIRE BAND.

All antennas utilize a GAP elevated asymmetric feed. A major benefit is the virtual elimination of the earth loss, so more RF radiates into the air instead of the ground. This feed is why a GAP requires NO RADIALS. Just as elevating a GAP offers no significant improvement to its performance, adding radials won't either, making set up a breeze.

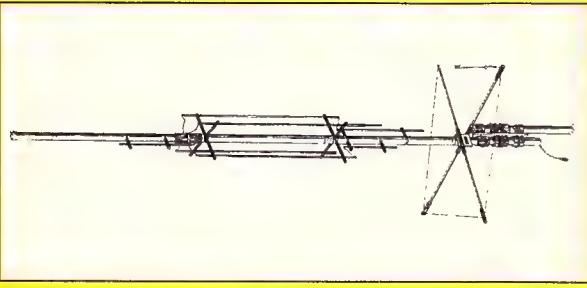
**A GAP antenna has no traps, coils or transformers.** This is important. The greatest sources of failure in multiband antennas are these devices. Perhaps you heard someone discuss a trap that had melted, arced or became full of water. Improvements to these inherent problems are the focus of the antenna manufacturer, while the basic design of the antenna remains unchanged. **GAP improved the trap by eliminating it!** Removing these devices means they don't have to be tuned and, more importantly, won't be detuned by the first ice or rain. The absence of these devices improves antenna reliability, stability and increases bandwidth.

Another major advantage to a GAP antenna is its NO tune feature. Screws are simply inserted into predrilled holes with a supplied nutdriver.

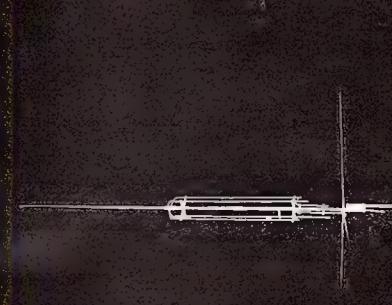
The secret is out and people in the know say:  
CQ - "The GAP consistently outperformed base-fed antennas...and was quieter."  
73 - "This is a real DX antenna, much quieter than other verticals."

RF - "To say this antenna is effective would be a real understatement. Switching back and forth on 40m between another multiband HF vertical and the GAP, there was no comparison. Signals were always stronger on the GAP, sometimes by 5 units, not just DBs."  
Worldradio - "These guys have solved the problem associated with verticals. That is, an awful lot of RF is wallowing around and dropping into the dirt instead of going outward bound. A half-wave vertical does need radials if it is end fed (at the bottom). But the same half-wave vertical does not (as much, hardly at all) if it is fed in the center."

IEEE - "Near field and power density analyses show another advantage of this antenna (asymmetric vertical dipole); it decreases the power density close to the ground, and so avoids power dissipation in the soil below it. The input impedance is very stable and almost independent of ground conductivity. This antenna can operate with high radiation efficiency in the MF/AM standard broadcast band, without the classical buried ground plane, so as to yield easier installation and maintenance."



Challenger DX



Eagle DX

# GAP

ANTENNA  
PRODUCTS INC.  
99 North Willow Street  
Fellsmere, FL 32948

TO ORDER, CALL  
**(561)-571-9922**

Come Visit Us At [gapantenna.com](http://gapantenna.com)



MODEL	BANDS OF OPERATION							COST
	2m	6m	10m	12m	15m	17m	20m	
Challenger DX	■	■	■	■	■	■	■	\$259
Eagle DX			■	■	■	■	■	\$269
Titan DX			■	■	■	■	■	\$299
Voyager DX				■	■	■	■	\$399

# SENIOR ENGINEER

NMB Technologies, Inc., a leader in the production of advanced electronic components and peripherals, is currently seeking a qualified engineering professional.

In this challenging position, you will perform in-depth analysis of existing power conversion technologies in order to optimize existing design platforms. You will also research new power conversion technologies to maximize performance and value and then use these technologies to develop practical design platforms for our product engineering groups in Japan, the UK, and the US. In addition to overseeing the transfer of new design platforms from the advanced engineering department to the three engineering groups, you will build and maintain close relationships with the advanced engineering departments of manufacturers of semiconductors and passive components.

The successful candidate will have 5 years' experience in the design of power conversion circuits or HF/VHF power circuits. Experience with computer simulations is also desired.

NMB offers a competitive salary, excellent benefits and a challenging, team-oriented work environment. For immediate consideration, please send your resume and salary history to: NMB Technologies, Inc., Attn: Personnel-SE, 9730 Independence Ave., Chatsworth, CA 91311. Equal Opportunity Employer.

**NMB**  
TECHNOLOGIES INC.



**RF Limited**

PO Box 1124 • Issaquah, WA 98027  
TEL (425) 558-9592 • FAX (425) 558-9704

**Operate your mobile transceiver  
virtually handsfree with the  
EM-900 Mobile Microphone.**



*Special Introductory Price  
\$139.95  
for complete kit!*



## DF-4000 The Ultimate Low Pass Filter

The DF-4000 is constructed of nickel plated steel cases, solid copper coils, and teflon plate capacitors. Unmatched attenuation - 100dB at 40MHz to help eliminate annoying TVI and RFI.

Frequency Coverage .....	DC - 30 MHz
Input/Output .....	50 Ohm, Non-Polar
Power Handling .....	4,000 Watts PEP (2,000 DC)
VSWR .....	1 to 1.2
Cutoff .....	32 MHz
Attenuation .....	80 - 100dB above 38 MHz
Design .....	13 <sup>th</sup> Degree Cauer-Parameter
Connectors .....	Teflon Insulated SO-239
Dimensions .....	8" x 5" x 2.75"
Holiday Sale Price .....	\$139.95

**TRIED RTTY YET?** If not, you're missing an exciting dimension in ragchewing, DX and contests. **VolksRTTY** kit plus your transceiver and PC gets you started today. Includes PCB, components, enclosure, HamComm shareware, and detailed instructions. Easy to build, great performance - only \$49.95. Assembled units \$64.95. SASE or tmayhan@accessone.com for details. Terry Mayhan, K7S2L, 4517 159th NE, Redmond, WA 98052.

**TUBES** for sale, all kinds. Send SASE for price-availability. K9GTK, 2932 W. 99th St., Evergreen Park, IL 60805. Phone/fax 708-423-0528. Email: tivas@ix.netcom.com

**TUBES WANTED:** Highest prices paid or will trade for all types of industrial, receiving and transmitter tubes. D & C Electronics, 3089 Deltona Blvd., Spring Hill, FL 34606. 800-881-2374.

**TUBES WANTED:** I pay cash or trade for all types of transmitting or special purpose tubes. Mike Forman, 1472 MacArthur Blvd., Oakland, CA 94602. 510-530-8840.

**VERTICAL USERS: NOVICE TO EXTRA.** An untechnical, indispensable manual analyzing various vertical antenna installations. \$10 ppd. Charles Schwartzbard, AF2Y, Box 1347, Clifton, NJ 07015.

**VIBROPLEX BUGS** with NY address wanted for private collection. Especially want bugs with beige or brown base, 2.5" or 3" wide base, gray base with red knobs, or S/N under 100,000. Other old or unusual keys and bugs and collections from estates wanted. Randy Cole, KN6W, 4540 Fairway, Dallas, TX 75219. 214-521-7041 or cole@netcom.com

**VKØIR HEARD ISLAND** commemorative t-shirts, same style shirt as team is wearing on QSL card. Proceeds benefit DXpedition. Same day order turnaround in time for Christmas, personal checks on U.S. banks okay, please no credit cards. Sizes remaining: large, extra-large, XXXL, 100% cotton U.S. made. \$20 Priority Mail stateside, \$25 DX Air Mail, postage included. Tom Anderson, WW5L, 3505 Cliffwood Drive, Bedford, Texas 76021-2043, Ph: 817-498-2820, e-mail: WW5L@gte.net

**WANT new in box:** GAP IV Voyager antenna. Rob, NØJR, 319-277-1499.

**WANTED:** 2000pF 5kv vacuum variable capacitor Jennings UCSL-2000-5S or equivalent. W1TMX, 860-859-2522.

**WANTED:** 3 medium to large ball bearings. W9CY: harv@juno.com

**WANTED:** Drake TR7 with CW filter and TR4CW with or without RIT. Any condition. Frank, KBØW, 916-635-4994.

**WANTED:** Electron tubes, ICS, semiconductors. ASTRAL, PO Box 707, Linden, NJ 07036. 800-666-8467.

**WANTED:** Icom IC-03AT 220 MHz hand-holds. Will consider non-functional radios. **Top dollar offered.** Contact Alan Sanders, Communications Specialists, Inc., 426 West Taft Avenue, Orange, CA 92665-4296. 800-854-0547, fax 800-850-0547.

**WANTED:** Tubes. Nobody pays more or faster than us! Mike Forman, 1472 MacArthur Blvd., Oakland, CA 94602, 510-530-8840.

**WWII Electronic Equipment.** Send \$2 for the 40 page list and receive \$5 credit on your first order. F.J. Conway, W4YIG, 2217 N.E. 17th Terrace, Ft. Lauderdale, FLA 33305-2415.

**YAESU FT-767** 6 meter module wanted. E-mail: rlunt@aol.com or R.T. Lunt, 2471 Jones Rd., Pottstown, PA 19465.

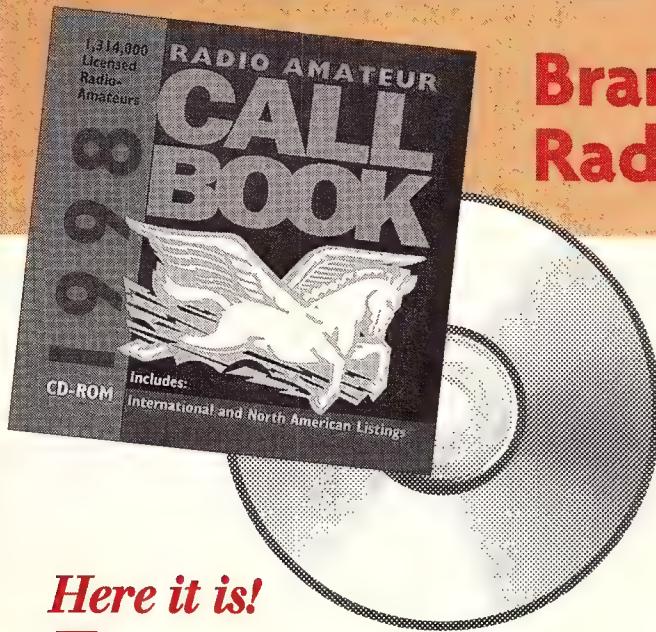
**YAESU**, new YS-60 SWR power meter, instructions \$90. Kenwood, new SP950 speaker w/filter \$110. Kenwood interface IF232C \$99. Kenwood CW filter YK88C-1 500 Hz, new \$99. Pierre, N6GO, 702-564-5311.

## JOBS

TEN-TEC is looking for licensed ham to work in sales. Handle calls on 800 line from both prospective and present customers. Conduct product demonstrations, plant tours and attend occasional trade shows. Contact Scott Robbins at 423-453-7172 or send resume. TEN-TEC, Inc., 1185 Dolly Parton Parkway, Sevierville, TN 37862.

**WANTED FOR SUMMER OF 1998:** Instructors in electronics, ham radio, computers and all other sciences. Small boys' science camp in Pennsylvania. Apply: Donald Wacker, P.O. Box 356, Paupack, Pennsylvania 18451. 717-857-1401.

# RADIO AMATEUR CALLBOOK 1998



**Here it is!  
The most  
accurate and extensive  
CD-ROM available!**

## FEATURES

- QSL Managers—We currently list over 54,000 entries.
- Browse feature
- Windows/DOS platform for US & international data retrieval
- Windows icon driven by mouse & DOS via menu
- Data display by callsign, last name, city, license class issue & expiration dates
- Search US stations by callsign, last name, county & zip code
- Search international data by callsign or text search by name, street, city, province or region after selection of country
- Print labels from Windows/DOS platforms. Windows application can do multiple label printing tasks.
- Listings of clubs, then and nows, military & silent keys
- US data includes time zones, latitude, longitude listings & area codes
- Morse code sound output to PC speaker

**Radio Amateur Callbook  
1695 Oak Street • Lakewood, NJ 08701**

## Brand **NEW** Amateur Radio Prefix Maps!

**OUR NEW CD OFFERS  
UNMATCHED COVERAGE  
OF THE WORLD...**

Brand new Colorful Maps of most of the World including small islands. Click on a button to view. "Only on the Radio Amateur Call Book CD-Rom."

The CD-ROM contains more than 1,450,000 listings worldwide covering more than 250 countries, islands and dependencies. The Radio Amateur Callbook/CD-ROM contains both North American and International listings!

Listings can be found quickly by name, location and call letters— even when the information is incomplete!

Extended Wordsearch allows users to specify search criteria. Search by name, city, zip code, all in one search!

The most accurate & extensive CD-ROM available.

The introduction of many new fields— Special Comment, Previous Call, Previous Class, Vanity Call Sign Indicator, E-Mail Address & Fax #.

## ORDER TOLL FREE

1-888-905-2966 (USA Only)

1-732-905-2961 • Fax 1-732-363-0338

E-mail: 103424.2142@compuserve.com

or fill out the coupon below. VISA/MC/AMEX accepted.

## ORDERING COUPON

Please send me:

QTY.	ITEM	NUMBER	PRICE
_____	Callbook CD-ROM Available November, 1997	RACD05	\$ 49.95

If ordering by credit card:

Card Type \_\_\_\_\_ Exp. Date \_\_\_\_\_

Card # \_\_\_\_\_ Signature \_\_\_\_\_

Address \_\_\_\_\_

Email address \_\_\_\_\_

If ordering by check or money order: I have enclosed a check/money order for \$ \_\_\_\_\_. (Please add sales tax in CA, DC, IL, MA, NJ, NY, OH, PA, TN, VA and Canada, and \$5.00 per order for postage and handling in US; \$7 for all shipments outside US.) Please include shipping instructions. Prepayment is required.

# ARRL VIDEOS: THE FAST, EASY,



**ANY ARRL  
VIDEO EXAM  
COURSE** **Only \$99**

**TECHNICIAN (REVISED!) • GENERAL • ADVANCED**

Save \$29! Order Your Video Exam Course And Computerized Exam Review Software And Receive **BOTH** For Only ..... \$129

## Why do things the hard way?

Sit back, relax and learn everything you need to know with our exclusive video courses!



### TECHNICIAN CLASS (Good through 6/30/2001)

**No Morse code required!**

Covers  
NEW  
Questions!

Your ARRL Technician Class Video Course is all you need to pass your FCC Technician Class exam, and start enjoying the exciting and ever-changing world of Amateur Radio.

Once you become a Technician Class ham, you've got the green light to explore every nook and cranny of the VHF/UHF ham bands—that's full access: all bands, all modes! You'll be underway, able to talk to friends (old and new) at home or in your car—always prepared for emergencies.

Plus...with packet radio (ham radio's "computer revolution") you can access an exciting worldwide network of Amateur Radio bulletin boards and electronic mailboxes.

Pass your written exam now with the ARRL Technician Class Video Course...and get in on the fun!

### GENERAL CLASS (Good through 6/30/98)

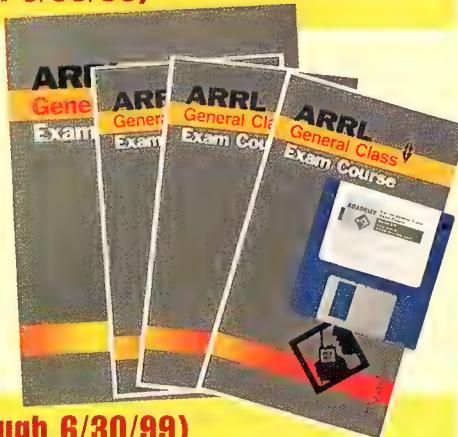
#### Learn code easily with the included Morse Academy software!

Your ARRL General Class Video Course and the included IBM-compatible Morse Academy software are all you need to pass your FCC General Class exam, and 13 WPM Morse code exam, and start enjoying your expanded privileges.

The General Class license is a powerful ticket, providing a giant step in amateur privileges. When you upgrade from Technician to General Class, you'll be able to use your new high power voice privileges on the amateur high frequency bands, and literally "travel the world" with your radio.

In addition, you'll have immediate access to an exciting range of modes including slow-scan TV, radioteletype, facsimile and Morse code, all on the worldwide bands.

Order your ARRL General Class video course and Morse Academy software package now, and see how quickly you're on the air with your General Class license!



### ADVANCED CLASS (Good through 6/30/99)

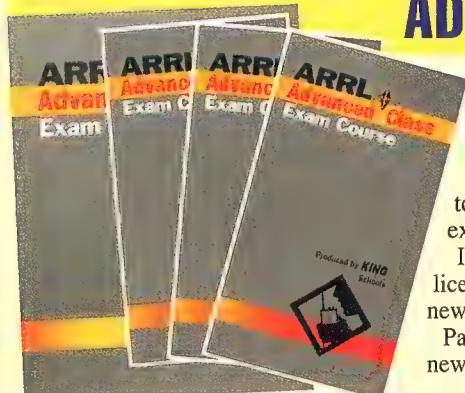
**No additional Morse code requirement!**

Your ARRL Advanced Class Video Course makes it easy to pass your FCC Advanced Class exam, giving you access to the less-crowded segments of the Amateur Radio bands.

With your Advanced Class license, you'll be able to operate on every frequency band assigned to the Amateur Radio Service. Segments of the 80, 40, 20 and 15-meter phone bands are reserved exclusively for Advanced and Amateur Extra Class operators.

If you find the General-class portions of the bands getting too crowded, your new Advanced Class license will let you move down to these less-used segments. And here you'll be able to experiment with new types of digital and image communications.

Pass your written exam now with the ARRL Advanced Class Video Course, and start exploring your new frequency privileges!



# FUN WAY TO YOUR LICENSE!



## Video That Really Teaches!

Learn through the magic of 3-D animation, full-screen "monster" graphics and live-action video. You'll find even the most difficult material easy to understand—and remember. Your video course puts you in complete control, learning at your own pace. You can stop, rewind, and review any part of the course whenever you like.

You can be confident your ARRL video courses cover everything the FCC wants you to know. They are produced by King Schools, Inc., world leader in the production of exam preparation video courses, and get the job done like no other medium can.

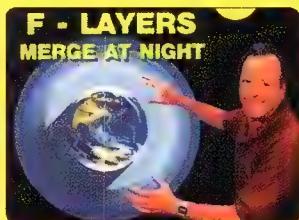
In addition, the veteran hams here at ARRL Headquarters stand ready to answer your questions.



We Guarantee  
Your Success.

## Your Complete ARRL Home Study Video Exam Course Includes:

- Three exciting video tapes—hours of invaluable instruction covering everything you need to pass your written exams (General Class includes Morse Academy software).
- Course Book with detailed notes.
- Every exam question, with correct answers and detailed explanations.
- Practice exams to "tune you up" for the real thing. On the big day you'll be more than ready, with no surprises!



## Ensure Your "Test Success" With ARRL's Computerized Exam Review.

After you've taken your video course, let your computer make it fun to ensure a top score on your exam.

The ARRL Computerized Exam Reviews are fun, user-friendly programs that let you choose questions by subject, or take them all. At your command, you'll see on-screen correct answers with ARRL's detailed explanations.

Plus...the program selects unanswered or previously missed questions, tracks your progress, and gives you a personal Report Card so you can watch your score improve!

Windows 95 and  
Windows 3x compatible.



A \$59 value.



With your ARRL video course, only ..... \$30

## "A fantastic job...a picture is worth a thousand words!"

— David Economos, KA1HCZ,  
New Hampshire

"The tapes were wonderful, especially for someone like me, who has no background in electronics!"

— Robin Krueger, N2YQE, New Jersey

"The videos were first class. And I especially like the PC-based Exam Review Software. Without it I couldn't have 'aced' the tests."

— Alberto Casanova, KE4MNF, Florida

"The only way to study."

— Jeff Aldridge, KE4OPW,  
North Carolina

## Here's what our graduates say:



## Order Risk Free

Examine your course for 20 days. If it's not what you expected, simply return it for a full refund—no questions asked. You will pass your FCC written (and for the General, Morse Code exam) within one year, or you can return your course materials for a full refund—every penny. You pass, or you don't pay! (Include a dated proof of purchase and the date and location of your VEC-administered exam session when you return your course.) Offer not valid after course expires.

**Call 1-888-277-5289 Or Tear Out And Mail Today!**



**YES! Send me my ARRL course now.** **Rush me the package checked below.**

SHIP TO: NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_

STATE \_\_\_\_\_ ZIP \_\_\_\_\_

TELEPHONE (      ) \_\_\_\_\_

CHARGE TO:  MASTERCARD  VISA

DISCOVER  AMEX

CARD NO. \_\_\_\_\_ EXP. \_\_\_\_\_

CHECK OR MONEY ORDER ENCLOSED

**TOTAL PURCHASE** \$ \_\_\_\_\_

In CT add 6% tax

In CA add 7.25% tax

**SUBTOTAL** \$ \_\_\_\_\_

**SHIPPING & HANDLING**

UPS SURFACE ..... \$5

2 DAY AIR ..... \$15

Foreign ..... \$69

**TOTAL AMOUNT** \$ \_\_\_\_\_

**The American Radio Relay League**

225 Main Street, Newington, CT 06111

860-594-0200 • Fax 860-594-0259

E-mail: [pubsales@arrl.org](mailto:pubsales@arrl.org)

QST

Also available from your local Amateur Radio dealer.

Repeaters List								
File Edit Help								
Repeaters Listed: 523								
Sort by Sequence Number								
Seq	State	Region	Location	Output	Input	Call	Repeater	Spons
1	CALIF	SAN DIEGO	Boulder Mtn	147.300	+	K655XC	c(csa)e103	Powa
2	CALIF	SAN DIEGO	Chula Vista	147.060	+	W6TIE	c(csa)e127	Mito
3	CALIF	SAN DIEGO	Clairemont	147.420	146.475	WB6FZC	c(csa)	SD I
4	CALIF	SAN DIEGO	Coronado	147.180	+	W6RLI	c(csa)e111	CP
5	CALIF	SAN DIEGO	El Cajon	145.180	-	KAGKTA	c	
6	CALIF	SAN DIEGO	La Jolla	146.085	+	K6QPY	c	LJ
7	CALIF	SAN DIEGO	Lyons Peak	146.265	+	W6SS	c(csa)e107.2	SM
8	CALIF	SAN DIEGO	Mountain View	147.180	+	JCC	c(csa)	
9	CALIF	SAN DIEGO	Mountain View	147.180	+	W6LV	c	
10	CALIF	SAN DIEGO	Mountain View	147.180	+	WB6LV	c	
11	CALIF	SAN DIEGO	Mountain View	147.180	+	W6ASH	c	
12	CALIF	SAN DIEGO	Mountain View	147.180	+	WB6SK	c	
13	CALIF	SAN DIEGO	Mountain View	147.180	+	W6JAK	c	
14	CALIF	SAN DIEGO	Mountain View	147.180	+	W6JCC	c	
15	CALIF	SAN DIEGO	Mc Woodson	147.195	+	K6JCC	c	
16	CALIF	SAN DIEGO	Mc Woodson	147.990	-	W6JAM	c1	
17	CALIF	SAN DIEGO	Paradise Hill	145.480	-	W6JVA	c127.3	
18	CALIF	SAN DIEGO	Paradise Hill	146.610	-	N6ZEN	c(csa)e107.2	
19	CALIF	SAN DIEGO	Point Loma	145.380	-	N6LWO	c(csa)e10	

# HIT THE ROAD...

## Find Repeaters Fast... with the TravelPlus for Repeaters™ CD-ROM

Planning a trip? Want to know which repeaters are within range from wherever you are along your travel route? Sound like the impossible dream? Not anymore. All you need is a few minutes and *TravelPlus*.™

This exciting new CD-ROM product enables you to locate repeaters along any travel route and access repeater data in ways you never thought possible. You can quickly find all the information you need to pre-program your rig or take along a sequential list of repeaters for your entire trip. The best part is that using *TravelPlus* is fast, easy and fun. If you can point and click a computer mouse, you can:

- Trace a route and find all repeaters within a specified range on whatever bands you select.
- Identify all repeaters within up to 500 miles of any location.
- Print map screens or repeater lists based on your travel route. Choose maps that display major highways and cities in the US and Canada, or more detailed maps that add state highways in the US.
- Customize repeater information for your needs. Find repeaters for selected bands; select repeaters only for certain locations or regions; locate open repeaters and those with autopatch capability; sort alphabetically by state, region and location; sort by frequency in ascending or descending order; sort in reverse sequence order for your return trip. Includes the entire ARRL VHF/UHF Repeater DataSource.
- Save route files and repeater list files to disk for future reference or for linking routes from one map set to another.
- View Help Topics for all screens.

*TravelPlus* includes the entire ARRL Repeater DataSource for selecting, sorting and printing custom VHF/UHF repeater listings. Once you've tried it you'll find *TravelPlus for Repeaters* indispensable in your travel planning. Order your copy today. ARRL Order No. 5862. \$39.95 plus \$4 shipping and handling.



Call our toll-free  
number

**1-888-277-5289**  
today.

**8 AM-9 PM** *NEW! Extended  
Eastern time Ordering Hours*

We'll be happy to take your order or provide  
you with the location of an ARRL Publications  
Dealer in your area.

### Minimum System requirements:

- IBM-compatible PC with a 386DX/25 MHz processor or better (486DX or Pentium™ recommended). Math coprocessor required.
- 8 MB of RAM (16 Mbytes or more recommended).
- Hard disk with at least 4 Mbytes of free space for installation.
- Microsoft Windows™ 3.1 or higher.
- 640 x 480 x 256-color graphics supported by Windows (recommended mode).
- CD-ROM drive supported by your system (double speed or faster recommended).
- Mouse or equivalent pointing device.

**ARRL**

225 Main Street, Newington, CT 06111-1494 tel: 860-594-0250 fax: 860-594-0303  
e-mail: [pubsales@arrl.org](mailto:pubsales@arrl.org) World Wide Web: <http://www.arrl.org/>



**Statement of Ownership, Management, and Circulation**  
(Required by 39 USC 3685)

1. Publication Title QST	2. Publication Number 0 0 3 3 - 4 8 1 2	3. Filing Date September 24, 1997
4. Issue Frequency Monthly	5. Number of Issues Published Annually 12	6. Annual Subscription Price \$34.00
7. Complete Mailing Address of Known Office of Publication (Not printer) (Street, city, county, state, and ZIP+4) 225 Main St., Newington, Hartford County, Ct, 06111-1494		
8. Complete Mailing Address of Headquarters or General Business Office of Publisher (Not printer) 225 Main St., Newington, Hartford County, Ct 06111-1494		

9. Full Name and Complete Mailing Addresses of Publisher, Editor, and Managing Editor (Do not leave blank)  
Publisher (Name and complete mailing address)

David Sumner, 225 Main St., Newington, CT, 06111-1494

Editor (Name and complete mailing address)

Mark J. Wilson, 225 Main St., Newington, CT, 06111-1494

Managing Editor (Name and complete mailing address)

Steve Ford, 225 Main St., Newington, CT, 06111-1494

10. Owner (Do not leave blank) If the publication is owned by a corporation, give the name and address of the corporation immediately followed by the names and addresses of all stockholders owning or holding 1 percent or more of the total amount of stock. If not owned by a corporation, give the names and addresses of the individual owners. If owned by a partnership or other unincorporated firm, give its name and address as well as those of each individual owner. If the publication is published by a nonprofit organization, give its name and address.

Full Name	Complete Mailing Address
American Radio Relay League, Inc.	225 Main St., Newington, CT 06111-1494

11. Known Bondholders, Mortgagors, and Other Security Holders Owning or Holding 1 Percent or More of Total Amount of Bonds, Mortgages, or Other Securities. If none, check box

None

Full Name	Complete Mailing Address

12. Tax Status (For completion by nonprofit organizations authorized to mail at special rates) (Check one)

The purpose, function, and nonprofit status of this organization and the exempt status for federal income tax purposes:

Has Not Changed During Preceding 12 Months

Has Changed During Preceding 12 Months (Publisher must submit explanation of change with this statement)

PS Form 3526, September 1995

(See Instructions on Reverse)

13. Publication Title QST	14. Issue Date for Circulation Data Below Sept.-96-Aug-97
Sept. 97	
15. Extent and Nature of Circulation	Average No. Copies Each Issue During Preceding 12 Months
a. Total Number of Copies (Net press run)	191141
b. Paid and/or Requested Circulation	9035
(1) Sales Through Dealers and Carriers, Street Vendors, and Counter Sales (Not mailed)	192724
(2) Paid or Requested Mail Subscriptions (Include advertiser's proof copies and exchange copies)	158957
c. Total Paid and/or Requested Circulation (Sum of 15b(1) and 15b(2))	167992
d. Free Distribution by Mail (Samples, complimentary, and other free)	1397
e. Free Distribution Outside the Mail (Carriers or other means)	0
f. Total Free Distribution (Sum of 15d and 15e)	1397
g. Total Distribution (Sum of 15c and 15f)	169389
h. Copies not Distributed	1174
(1) Office Use, Leftovers, Spoiled	10108
(2) Returns from News Agents	11644
i. Total (Sum of 15g, 15h(1), and 15h(2))	191141
Percent Paid and/or Requested Circulation (15c/15g x 100)	99.76
16. Publication of Statement of Ownership <input type="checkbox"/> Publication required. Will be printed in the December issue of this publication <input type="checkbox"/> Publication not required	Date September 24, 1997
17. Signature and Title of Editor, Publisher, Business Manager, or Owner <i>Mark J. Wilson</i> Ed. M.	

I certify that all information furnished on this form is true and complete. I understand that anyone who furnishes false or misleading information on this form or who omits material or information requested on the form may be subject to criminal sanctions (including fines and imprisonment) and/or civil sanctions (including multiple damages and civil penalties).

**Instructions to Publishers**

1. Complete and file one copy of this form with your postmaster annually on or before October 1. Keep a copy of the completed form for your records.
2. In cases where the stockholder or security holder is a trustee, include in items 10 and 11 the name of the person or corporation for whom the trustee is acting. Also include the names and addresses of individuals who are stockholders who own or hold 1 percent or more of the total amount of bonds, mortgages, or other securities of the publishing corporation. In item 11, if none, check the box. Use blank sheets if more space is required.
3. Be sure to furnish all circulation information called for in item 15. Free circulation must be shown in items 15d, e, and f.
4. If the publication had second-class authorization as a general or requester publication, this Statement of Ownership, Management, and Circulation must be published; it must be printed in any issue in October or, if the publication is not published during October, the first issue printed after October.
5. In item 16, indicate the date of the issue in which this Statement of Ownership will be published.
6. Item 17 must be signed.

Failure to file or publish a statement of ownership may lead to suspension of second-class authorization.

PS Form 3526, September 1995 (Reverse)

## The **DRAKE** TR270 Two Meter FM Transceiver

### Outstanding Performance in a Desktop Design.

We have something in common. You want the best FM transceiver money can buy... and we build it. The Drake TR270 - a desktop two-meter transceiver with a 144/440, dual band receiver. When fully equipped, the Drake TR270 boasts total integration of FM voice, packet, satellite, as well as weather fax and ACARS data reception. Better yet, all of these modes can be easily customized to fit the user's preferences.

FM VOICE

▼  
DUAL BAND  
RECEIVER

▼  
PACKET

▼  
DATA

▼  
SATELLITE



Experience history in the making, contact  
your nearest Drake dealer or call  
513-746-4556 today to order your TR270.

[www.rldrake.com](http://www.rldrake.com)

INTEGRATION

CUSTOMIZATION

CONVENIENCE



# AFFORDABLE BOOM MIC. HEADSET

State-of-the-art, **KIT: 44<sup>95</sup>** **ASSEMBLED: 64<sup>95</sup>**  
noise-cancelling  
electret Mic. with  
tailored response  
and large ear muffs  
reduce external  
noise. The Model  
TR-2000 is from  
an established  
aviation headset  
manufacturer.  
Prices plus S&H.  
Less connectors  
Connector-installed  
units available for  
many radios. We  
provide information  
to help you interface  
to nearly any radio.  
Credit card  
phone orders  
accepted.



**CALL NOW-TOLL FREE  
1-800-634-0094**

30-DAY, MONEY-BACK GUARANTEE  
**WARREN GREGOIRE & ASSOCIATES**

229 EL PUEBLO PLACE, CLAYTON, CA 94517 USA PHONE 510-673-9393  
FAX 510-673-0538 E-MAIL [INFO@WARRENGREGOIRE.COM](mailto:INFO@WARRENGREGOIRE.COM)

World Renowned  
Logging Software  
For PCs!



Get To Know  
**WJ2O**  
Master QSO Logging Program

## WJ2O Software

P.O. Box 16  
McConnellsville, NY 13401 USA

Contact Us For Info & A Demo

1-800-944-WJ2O

(315) 245-1010

Fax (315) 245-1336

E-mail: [wj2o@aol.com](mailto:wj2o@aol.com)

Web: <http://www.webprint.com/wj2o>

## Antenna Software by W7EL

**EZNEC** ("Easy-NEC") captures the power of NEC-2 while offering the same friendly, easy-to-use operation that made ELNEC famous. EZNEC lets you analyze nearly any kind of antenna - including quads, long Yagis, and antennas within inches of the ground - in its actual operating environment. Press a key and see its pattern. Another, its gain, beamwidth, and f/b ratio. See the SWR, feedpoint impedance, a 3-D view of the antenna, and much, much more. With 500 segment capability, you can model extremely complex antennas and their surroundings. Includes current source and transmission line models. Requires 80386 or higher with coprocessor, 2 megs available extended RAM, EGA/VGA/SVGA graphics.

**ELNEC** is a MININEC-based program with nearly all the features of EZNEC except transmission line models and its 127 segment limitation (6-8 total wavelengths of wire). Not recommended for quads, long Yagis, or antennas with horizontal wires lower than 0.2 wavelength; excellent results with other types. Runs on any PC-compatible with 640k RAM, CGA/EGA/VGA/Hercules graphics. Specify coprocessor or non-coprocessor type.

Both programs support Epson-compatible dot-matrix, and HP-compatible laser and ink jet printers.

**Prices** - EZNEC \$89, ELNEC \$49, ppd. Add \$3 outside U.S./Canada. VISA AND MASTERCARD ACCEPTED.

**Roy Lewallen, W7EL** phone 503-646-2885  
P.O. Box 6658 fax 503-671-9046  
Beaverton, OR 97007 email [w7el@teleport.com](mailto:w7el@teleport.com)

## NEW! ALL 1300 ACTUAL QUESTIONS! FCC Commercial General Radiotelephone Operator License (GROL) Plus Ship Radar

**\$29.95** Plus \$3.00  
shipping

Complete FCC Element 1, 3 and 8 Question Pools

### Become an FCC licensed Electronic Technician

- 496-page fully-illustrated textbook covers everything you need to know to get your FCC commercial radiotelephone operator license w/radar endorsement.
- Contains every possible word-for-word examination question (including the new updates), multiple choices, and answers with explanation of the answer.
- Complete information on every commercial radio license examination ...and how you can qualify.
- FCC commercial radio regulations included!
- Commercial radio operator testing available.



**National Radio Examiners**  
Div., The W5YI Group, Inc.  
P.O. Box 565206, Dallas, TX 75356  
VISA, MasterCard, or Discover  
Call toll free: **1-800-669-9594**

## Holiday Gift Ideas

**★ You need to  
Up-Grade to NA  
for Contest Logging**

Fully featured, web and  
telephone supported, constantly being  
updated and refined, YOU need

**NA...** the contestor's choice

by Dave Pruett, K8CC

State-of-the-art contesting program. Covers all major contests. Fully featured and works with all PC's from XT's to the latest Xx86 chip. Plenty of space for QSO's, super fast duping. QSL and out put options galore. Great gift idea for the contestor in your family. Includes comprehensive owners manual that helps you set-up, learn and start having contesting fun!

**RBS-NA New Purchase \$60**

**RBS-NAU v9 upgrade \$40**

Includes 12 months access to web site for up-grades and on-line help.

*US shipping \$4.50. Overseas \$6.50  
see [www.contesting.com/datom](http://www.contesting.com/datom) for latest details and version #*

**1998 15 month Calendars from**



Radio Classics and Amateur Radio calendars from CQ...a 1997 sell-out. Order yours today. Great stocking stuffer. 15 months of pictures taken by professionals and loaded with helpful information. Includes contest dates, Moon phases and other information. The Classics Calendar is full of radios from by-gone days. The Amateur Calendar has shots taken from some of the most well known stations from around the world.

**CQ-RCC98 Classics \$9.95**

**CQ-ARC98 Amateur \$9.95**

*US shipping \$4.50. Overseas \$6.50*

**(800) 457-7373  
Radio Bookstore**

PO Box 209

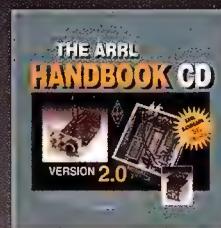
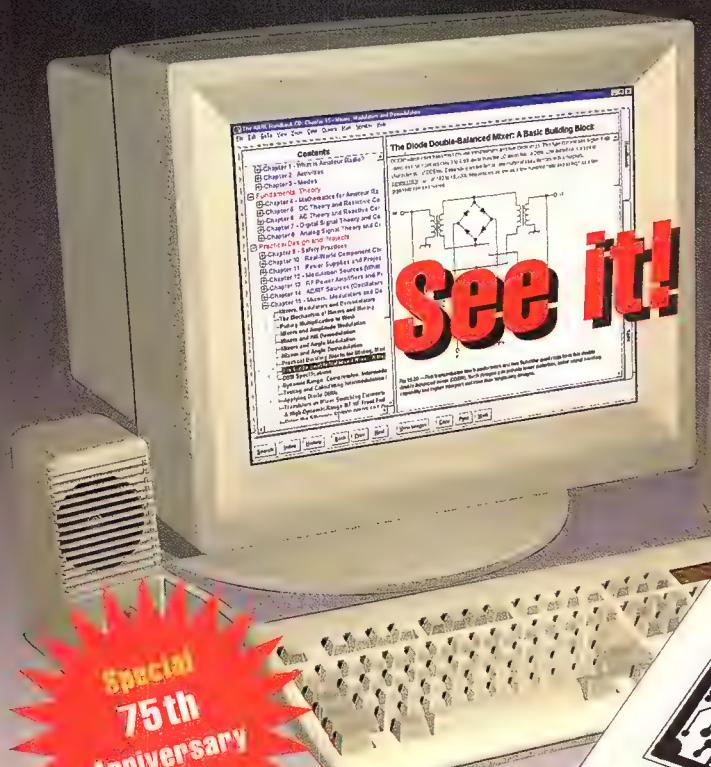
Ridge, NH 03461

[nx1g@top.monad.net](mailto:nx1g@top.monad.net)

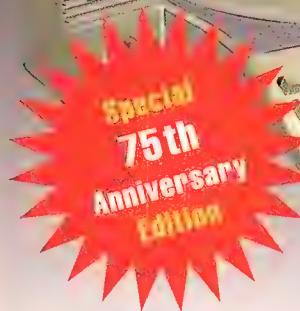
[www.radiobooks.com](http://www.radiobooks.com)



# The 1998 ARRL Handbook CD-ROM is ready-to-go. *Take it for a spin!*



## Hear Audio clips!



## Print and Save!

We've retained all of the features that made version 1.0 of the ARRL Handbook CD an enormous hit with Amateurs all over the world... and made version 2.0 even better and easier to use. You'll find:

- The complete text of the 1998 *ARRL Handbook*—every word, every page.
- An enhanced image viewer with an auto-sizing feature and a thumbnail print preview that allows easy page adjustments.
- The Handbook template packages are now included as Adobe Portable Document Format files, and a copy of Adobe's Acrobat Reader 3.0 is included on the CD-ROM to allow you to view and print the template packages.
- An enhanced word index with a "Search the index" feature that allows you to type in a word and see the matching words as you type.
- World Wide Web URLs in the text are now hotspots that you can click to launch your Web browser and view the contents of the URL.
- Microsoft Windows required.

### The 1998 ARRL Handbook CD

ARRL Order No. 1808

Retail \$49.95

plus \$4 shipping and handling.



# ARRL

fax: 860-594-0303

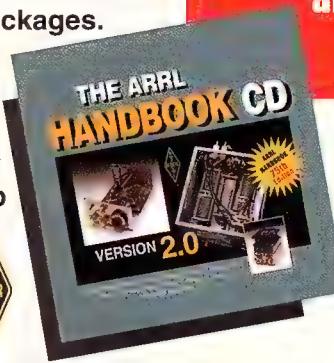
225 Main Street • Newington, CT 06111-1494 tel: 860-594-0250  
e-mail: [pubsales@arrl.org](mailto:pubsales@arrl.org) World Wide Web: <http://www.arrl.org/>

## Find it Fast! with versatile search capabilities!

Return to your favorite  
places with bookmarks!

Enlarge Text, Photos  
and Drawings!

And much more!



Call our toll-free number  
**1-888-277-5289** today.

8 AM-8PM Eastern time

We'll be happy to take your order or  
provide you with the location of an ARRL  
Publications Dealer in your area.

**KITANO  
KEY  
COMPANY**  
619 Cherry Valley Rd  
Princeton, NJ 08540



(609) 924-0145

Kit Raymond, N2LMC - \$85, s&h \$7.  
A GREAT XMAS GIFT! Engrave your call, \$15.  
Brass, 3.5x2 (10oz) / Visa & MC / Patent Pending  
Review QST 8/95 / e-mail: KITANO@JUNO.COM

**208-852-0830**  
<http://www.rossdist.com>

**SPECIAL!**  
Under  
\$370.00

**KENWOOD**  
**TH-G71A**  
Dual-Band Handheld

**RDC**

Check Out Our Specials! We're On The Web.  
Over 9000 HAM items in Stock. All Prices Cash FOB Preston  
ROSS DISTRIBUTING, 78 S. State Street, Preston, ID 83263  
Hours Tue.-Fri. 9-6 • 9-2 Mondays Closed Saturday & Sunday

# Are you radioACTIVE?



## MORSE CODE MUSIC

Get Hooked on Code with this, Powerful breakthrough! 43 Morse Code characters sent with a rhythmic beat. Easy way to learn or retain Morse Code skills. Now the secret is yours! Order "The Rhythm Of The Code" cassette today! Send \$9.95 add \$2 shipping. **NEW!** for internet users! Visit our web page at <http://home.att.net/~p.kawa/music.html> and hear a sample copy before you buy it. COOL! E-mail: p.kawa@worldnet.att.net Kawa Records, P.O. Box 319-Q, Weymouth, MA 02188. Call Toll Free 888-222-5292 Visa/MC

Linda Reeder, N7HVF, sure is! Linda, totally blind since birth, is pictured above recording for **NEWSLINE**.

"I first learned of HANDI-HAMs in 1986, when I was a Technician. In 1987, I had an aneurysm and almost died. When I recovered, I had to learn the code all over again... I was so discouraged. I attended HANDI-HAM Radio Camp, and it was the best thing I did all year! I came home with my General and two weeks later got my Advanced. Now I have my Extra. It's wonderful to enrich the lives of the disabled."

The HANDI-HAM System is an international organization of able-bodied and disabled hams who help people with physical disabilities expand their world through amateur radio. The System matches students with one-to-one helpers, provides instruction material and support, and loans radio equipment.

Isn't it time you got radioACTIVE with the Courage HANDI-HAM System?

Call or write:



Courage HANDI-HAM System WØZSW  
Courage Center, 3915 Golden Valley Road  
Golden Valley, MN 55422 • (612) 520-0515

## LIGHTNING-SURGE PROTECTOR

Heavy Duty • Easily Replaceable Gas Tube Element • Waterproof  
• Red Ranger II Type = 0-3.0 GHz / UHF SO-239 Type = 0-1.5 GHz  
Out-Door Use! N-F-F #50403-X / UHF(SO-239) F-F #20206-X  
In-Door Use! N-M-F #20310-X / UHF(SO-239) M-F #20207-X  
UHF Type = \$39.95 ea.

Power(P.E.P.): -1

200W/HF

110W/VHF

40W/UHF



(Picture: N-M-F #20310-X)

Power(P.E.P.): -2

650W/HF

260W/VHF

100W/UHF

X = -3(2KW/800W/320W P.E.P. HF/VHF/UHF) (FM & CW Mode = x 50%) OEM or Dealer Inquiry Welcome!! 5.7GHz is also available for OEM!

For Catalog and order form, call **Lyrics** International Corporation

8 Amelajack Blvd. Suite 362, Newman, GA 30265 FAX: (770) 502-9827

INTERNET: 103222.760@compuserve.com Tel: (770) 251-2225

## NEWS from HIGH SIERRA!

New mobile antennas

### MODEL 1500 MODEL 1600 RV SPECIALS

For details on the new models and accessories, check out our web pages or request a copy of our all-new brochure.

**\$275**

Price includes  
control panel  
and mounting  
hardware kits

Ask about  
"package"  
discounts!

High Sierra Antennas, Box 2389  
Nevada City, CA 95959 USA  
Tel: 916-273-3415, fax: 916-273-7561  
<http://www.hsantennas.com/info>  
e-mail: [cobler@hsantennas.com](mailto:cobler@hsantennas.com)

## Notice - All CW Operators

Fantastic Keyer Kits! New Super CMOS III Keyer partial kit, (August '95 QST, p26) \$58 US, \$60 DX. Super CMOS II (Nov 90 QST, '92-'95 Radio Amateur's Handbook, p29-6) still available at \$48 US, \$50 DX post pd. Check or MO OK, no credit cards. CA add tax. Idiom Press, Box 1025, Geyserville CA 95441

## THE QSL MAN NOW!! Free QSLs

Join the **W4MPY QSL CLUB**  
and qualify for FREE QSLs  
Write for complete information  
Box 73, Monetta, SC 29105-0073  
Phone or FAX (803) 685-7117  
Email: [W4mpy@PBTComm.net](mailto:W4mpy@PBTComm.net)  
URL: <http://www.mindspring.com/~w4mpy/>

**XMATCH®** Antenna Tuner

- SWR rated at power
- Outstanding efficiency
- Innovative patented circuit

INFO \$3.00



Paul - N4XMM  
7001 Briscoe Lane • Louisville, KY 40228

# ARRL Publications BOOKCASE

Extended  
Ordering Hours:  
8 AM-9 PM  
Eastern time  
Monday-Friday  
1-888-277-5289

## GREAT GIFT IDEA!

### Handy References

**The 1998 ARRL Handbook for Radio Amateurs** - This special 75th anniversary edition is the best and most informative book ever published in communications and applied electronics.. Order No. 1786 ..... \$32

**ARRL HANDBOOK CD 2.0** features all the text and illustrations found in the 1998 printed version. Order No. 1808 ..... \$49.95

**The 1997-1998 ARRL Repeater Directory** includes more than 20,000 listings for voice and digital repeaters and propagation beacons located in North, Central and South America. Order No. 6176 ..... \$8

**TravelPlus for Repeaters™ CD-ROM**. Choose your route, and TravelPlus will identify all of the repeaters along the way. Use detailed maps to list repeaters in specific locations or regions, or create custom lists from the entire ARRL VHF/UHF Repeater DataSource. Windows compatible. Order No. 5862 ..... \$39.95

**The Radio Amateur's World Atlas**. Booklet of full-color maps showing country boundaries, call-sign prefix boundaries, CQ zones, states and provinces, and more. Order No. 5226 ..... \$9.95

**The ARRL Net Directory** 1997-98 edition. Order. No. 6265 ..... \$4

**The ARRL Radio Buyer's Sourcebook**. Selected *QST* Product Reviews from 1981 through 1991. Order No. 3452 ..... \$15

**The ARRL Radio Buyer's Sourcebook Volume 2**. All *QST* Product Reviews published in 1991 and 1992. Order No. 4211 .... \$15

**The ARRL VHF/UHF Radio Buyer's Sourcebook**. Nearly 100 product reviews covering amplifiers, antennas and accessories, and all types of transceivers—hand-holds, single-band, dual-band and multimode. Order No. 6184 ..... \$12

**The Best of the New Ham Companion**. From the popular *QST* column. Order No. 6001 ..... \$12

### License Study Materials

**Now You're Talking! All You Need to Get Your Ham Radio Technician License**. A complete study guide for your first license. Good through 6/30/2001. Order No. 5978 ..... \$19

**The ARRL's Tech Q&A—Your Quick & Easy Path to a Technician Ham License**. Question-and-answer-format study guide for the new Novice and Technician license exams. Good through 6/30/2001. Order No. 6222 ..... \$12.95

With our exclusive **Licensing Video Courses**, you'll be on-the-air or get your upgrade in no time!

**ARRL Technician Class Video Course**. Good through 6/30/2001. Order No. 6192 ..... **Revised** ..... \$99

**ARRL Technician Class Video Course with Computerized Exam Review Software**, Windows version 3.5-inch diskettes. Order No. 6206 ..... **Revised** ..... \$129

**ARRL General Class Video Course**. Includes IBM-format Morse Academy code software. Good through 6/30/98. Order No. 4750 ..... \$99

**ARRL General Class Video Course with Computerized Exam Review Software**, Windows version 3.5-inch diskettes. Order No. 4769 ..... \$129

**ARRL Advanced Class Video Course**. Good through 6/30/99. Order No. 5227 ..... \$99

**ARRL Advanced Class Video Course with Computerized Exam Review Software**, Windows version 3.5-inch diskettes. Order No. 5315 ..... \$129

**General Class License Manual**. Good through 6/30/98.

Order No. 4688 ..... \$12

**Advanced Class License Manual**. Good through 6/30/99.

Order No. 4947 ..... \$12

**Extra Class License Manual**. Good through 6/30/2000.

Order No. 5390 ..... \$12

**The FCC Rule Book: Complete Guide to the FCC Regulations Governing Amateur Radio. NEW! RF Safety Rules!**

Order No. 5102 ..... \$12

**Ham Radio Made Easy** may be the only beginner-level book with "attitude." Order No. 5374 ..... \$15.95

**Understanding Basic Electronics** is for beginners and those who want to brush up on electronics principles. Order No. 3983 ..... \$20

**First Steps in Radio**. A tutorial on electronics principles tailored to the beginner. Order No. 2286 ..... \$6

### Learning the Morse Code

**Your Introduction to Morse Code**. Teaches all the characters and provides plenty of practice. Two 90-minute cassettes.

Order No. 5986 ..... \$10

**Audio CD** Order No. 5811 ..... \$12

**ARRL Code Practice Set 1**: 5 to 10 WPM. Two 90-minute cassettes. Order No. 2227 ..... \$10

**ARRL Code Practice Set 2**: 10 to 15 WPM. Two 90-minute cassettes. Order No. 2235 ..... \$10

**ARRL Code Practice Set 3**: 15 to 22 WPM. Two 90-minute cassettes. Order No. 5692 ..... \$10

**Audio CD** Order No. 5706 ..... \$12

**GGTE Morse Tutor Gold** software for IBM PCs and compatibles teaches you the code and provides plenty of practice.

3.5-inch diskettes Order No. 3258 ..... \$30

**Morse Code: The Essential Language** Order No. 0356 ..... \$8

### Antennas and Transmission Lines

**The ARRL Antenna Book** is the definitive source for information on state-of-the-art antenna and transmission line theory and construction. Order No. 6133 ..... \$30

Five volumes are available in **The ARRL Antenna Compendium** series, and each is packed with previously unpublished articles on all the popular types of HF/VHF/UHF antennas and some you've never heard of!

**ARRL Antenna Compendium Volume 1**. Articles on multiband portable, quads and loops, baluns and the Smith Chart.

Order No. 0194 ..... \$10

**ARRL Antenna Compendium Volume 2**. Verticals, an attic tribander, antenna modeling and propagation. Order No. 2545 ..... \$14

**ARRL Antenna Compendium Volume 3**. Discover a 12-meter quad, a discone, modeling and VHF/UHF ray tracing. Order No. 4017 .... \$14

**ARRL Antenna Compendium Volume 4**. Includes IBM-format software. More antenna-ideas and practical projects.

Order No. 4912 ..... \$20

**ARRL Antenna Compendium Volume 5**. Includes IBM-format software. Baluns, HF beams and Yagis, quads, verticals, and more. Order No. 5625 ..... \$20

**ARRL Microsmith version 2.3**. Smith Chart simulation program for the IBM PC and compatibles. 3.5-inch diskette.

Order No. 4084 ..... \$39

**Antennas and Techniques for Low Band DXing** is an in-depth treatment of the antennas and operating strategies you'll need to span the continents on 40, 80 and 160 meters.

Order No. 4661 ..... \$20

**W1FB's Antenna Notebook** Order No. 2618 ..... \$10

*Vertical Antenna Classics* is a compilation of previously published articles on the art and science of the vertical antenna.

Order No. 5218 ..... \$12

## Operating/SWL

**The ARRL Operating Manual.** The most valuable reference manual to making the best use of your station and operating privileges. Order No. 6141 ..... \$25

**Personal Computers in the Ham Shack.** Learn how you can enhance your enjoyment of ham radio with computers.

Order No. 5714 ..... \$15.95

**Your VHF Companion.** Explore fascinating VHF activities, such as FM and repeaters, packet, satellites, amateur TV and more.

Order No. 3878 ..... \$10

**Your Mobile Companion.** A practical, easy-to-digest introduction to the fun that awaits the mobile operator. Order No. 5129 ..... \$12

**Your Packet Companion** will get you on the cutting edge of digital ham radio in no time. Order No. 3959 ..... \$10

**Your Ham Antenna Companion** provides all the antenna basics and much more in easy-to-understand, nontechnical language.

Order No. 5110 ..... \$10

**QRP Power** shows just how much fun it is to operate with 5 W or less. Order No. 5617 ..... \$12

**Low-Profile Amateur Radio** is for the ham who lives where antennas are frowned upon. Order No. 4114 ..... \$8

**Hints and Kinks for the Radio Amateur.** Best tips, suggestions and projects from the popular *QST* column.

14th Edition. Order No. 6095 ..... \$12

13th Edition. Order No. 3851 ..... \$10

**The ARRL DXCC Countries List** (Sept. '97 ed.) Order No. 0291.. \$2

**Radio Frequency Interference: How to Find It and Fix It** is filled with proven ways to solve common—and not-so-common—RFI or EMI problems, whatever their cause. Order No. 3754 ..... \$18

**Passport to World Band Radio (1998)** is the TV Guide of shortwave listening. Order No. 6427 ..... \$20

**World Radio TV Handbook (1997)** is the most complete, accurate, and up-to-date sourcebook on international broadcasting.

Order No. 6060 ..... \$25

## Computer Software Library

**ARRL Periodicals CD-ROM** is a compilation of all *QST*, *QEX* and *NCJ* issues on one CD.

**1996 Edition**, Order No. 6109 ..... \$19.95

**1995 Edition**, Order No. 5579 ..... \$19.95

**QST View CD-ROM** includes back issues of *QST* in convenient, space-saving CD-ROM format. ..... \$39.95 per set.

Years 1990-94 Order No. 5749 1975-79 Order No. 5773

1985-89 Order No. 5757 1970-74 Order No. 5781

1980-84 Order No. 5765

**Buckmaster's HamCall CD-ROM.** Features US and extensive international listings. Oct. 1997 edition. Order No. 1778 .. \$49.95

**The Radio Amateur Callbook CD-ROM.** Includes more than 1.4 million listings world-wide. Winter 1997 edition.

Order No. 6257 ..... \$49.95

## Packet and Digital

**Packet: Speed, More Speed and Applications** is for packet enthusiasts interested in medium- to high-speed packet systems.

Order No. 6052 ..... \$15

**Practical Packet Radio** covers everything the packet-active ham needs to know: setting up a station, getting on the DX packet cluster, and much more. Order No. 5307 ..... \$15.95

**Getting on Track with APRS: A Hand-On Guide to the Automatic Packet Reporting System** is your one stop for quick-and-easy instructions for installing and using this exciting new map-based tracking system. Order No. 5854 ..... \$14.95

## Practical Circuits and Design

**ARRL Radio Designer 1.5.** Create computerized models of audio, radio and electronic circuits so you can see how they work and improve them before you begin building. Order No. 4882 ..... \$150

**Introduction to Radio Frequency Design** presents a treatment of the fundamental methods of radio frequency design using mathematics as needed to develop intuition for RF circuits and systems. Order No. 4920 ..... \$30

**The ARRL Electronics Data Book** is an aid to the radio amateur or RF design engineer. Includes valuable tables and charts for formulas and semiconductor pin-out diagrams, plus many popular circuits and building blocks. Order No. 2197 ..... \$15

**Solid State Design for the Radio Amateur.** Essential for every technical library. Circuit design and applications for radios, power supplies and test equipment. Order No. 0402 ..... \$15

**W1FB's Design Notebook: Practical Circuits for Experimenters** is just the book for the avid builder of Amateur Radio equipment. Order No. 3207 ..... \$10

**The ARRL Spread Spectrum Sourcebook** contains reprints of most spread spectrum articles from *QST* and *QEX* and more.

Order No. 3177 ..... \$20

**W1FB's QRP Notebook** is packed with construction projects for QRP transmitters, receivers and accessories. Order No. 3657 ..... \$10

## Space and VHF/UHF/Microwave Communications

**The Satellite Experimenter's Handbook.** Information you need to communicate through or receive signals from a growing fleet of orbiting satellites. Order No. 3185 ..... \$20

**The ARRL Satellite Anthology.** Includes Phase 3D details. Your most up-to-date source on Amateur Radio satellite operation.

Order No. 5595 ..... \$12

**Weather Satellite Handbook.** An easy-to-use reference for anyone interested in viewing our world from space.

Order No. 4483 ..... \$20

**The ARRL UHF/Microwave Experimenter's Manual** includes information on design and fabrication techniques, propagation, antennas and much more. Order No. 3126 ..... \$20

**The ARRL UHF/Microwave Projects Manual** contains dozens of construction articles for transverters, preamplifiers, power amplifiers, antennas, and test and measurement equipment.

Order No. 4491 ..... \$20

If you'd like a complete publications listing or would like to place an order, please contact us:

1. To order or obtain the address of an ARRL Dealer near you, call toll-free (US): 1-888-277-5289 (non-US call 860-594-0250)—8 AM-9 PM Eastern time.

2. Fax 1-860-594-0303 24 hours a day, 7 days a week.

3. By mail to: ARRL, 225 Main St, Newington CT 06111-1494 or

4. Visit our World Wide Web site: <http://www.arrl.org/>

We accept the following major credit cards: American Express, MasterCard, Visa and Discover.

## Shipping and Handling Information

In the US, add the following amounts to your order to cover shipping and handling (S/H). Add an additional \$1.50 to the US rate for shipment outside the US. US orders will be handled via UPS or comparable service where UPS delivery is not possible. International Air and other specialty forwarding methods are available. Please call or write for information. Sales Tax Information: CT residents add 6% state sales tax (including S/H). CA residents add 7.25% state sales tax to Video License Courses only (excluding S/H). Canadian residents of Nova Scotia, New Brunswick and Newfoundland add 15% HST, all other provinces add 7% GST (excluding S/H).

Amount of Order	Add	Amount of Order	Add
\$10.00 or less	\$3.00	40.01 - 50.00	7.00
10.01 - 20.00	4.00	50.01 - 75.00	8.00
20.01 - 30.00	5.00	Over \$75.00	9.00
30.01 - 40.00	6.00		



Prices are subject to change without notice.

# Force 12, "THE ORIGINAL"

This is the 4th Birthday of the C-3.

In October, 1993, during the California QSO Party, the C-3 was delivered by 'Dr. Tom', (N6BT). It was a long awaited delivery, as it had taken 2 years of development and invention. It was a beautiful, new arrival and changed the world of antennas forever.

**The C-3 became the World's First TRAPLESS TRIBANDER.**

Like fine art, there is only one original:  
**FORCE 12**

Not only does the C-3 provide outstanding performance on 20-15-10, it also has real gain on the 17 & 12 mtr WARC bands, making a great 5-band beam. After delivering several hundred C-3's and receiving scores of unsolicited testimonials, Force 12 wants **you** to share in the excitement of the C-3 and the entire C-Series line.



You can enjoy Amateur Radio with an antenna that makes your radio 'Sparkle'!

## CHECK OUT OUR SPECIAL PRICES

To celebrate the 4th birthday of the tremendous C-3,  
**FORCE 12 is making a LIMITED TIME, DIRECT SALES OFFER.**

Place your order now to get an original 'C' model antenna at these special prices:

<u>Model</u>		<u>List Price</u>	<u>Sale Price</u>	<u>D-Model</u>
C-3	20-10, 18' boom	\$525	\$450	\$498
C-4	40, 20-10, 18' boom	675	575	635
C-4XL	2el40, 20-10, 30' boom	895	775	849
C-3S	20-10, 12' boom	450	385	420
C-4S	40, 20-10, 12' boom	595	500	550
C-4SXL	2el40, 20-10, 23' boom	849	725	800
C-3XL/D	320, 315, 410, 32' boom	1190		1000
<b>B-1 Balun</b>	3KW 1:1 Force 12 balun	40	35	

Antennas are standardly rated for minimum 80 mph. 'D' models are 100 mph. Special order 'H' for 120 mph. The C-3, C-4, C-3S, C-4S ship in our standard 4' box, excellent for DXpeditions (another FORCE 12 first!).

*Force 12 continues to Sharpen the Leading Edge.  
Buy the real thing from the leader in High Performance Antennas.*

**Electrically and mechanically superior.  
If it's riveted, it's a Force 12!**

*Why imagine the ultimate when you can have it?*

**Order Line: (800)248-1985 or Fax (408)720-9055**

For full brochure: (408) 720-9073

Force 12 East: **Natan Huffman, W6XR (607) 275-9747**

Internet: [force12e@lightlink.com](mailto:force12e@lightlink.com)

Force 12 Web Site <http://www.QTH.com/force12>

3015-B Copper Road, Santa Clara, CA 95051



**THE BEST BATTERIES  
IN AMERICA!**

**HOLIDAY '97 SPECIALS!**

NEW for **YAESU FT-50R / 40R / 10R:**  
**FNB-V47** pk. **7.2v 1200mAh \$39.95**  
**FNB-41** pk. (5w) **9.6v 700mAh \$39.95**  
**BC-601c** **Rapid/Trickle Charger \$64.95**

For **YAESU FT-51R / 41R / 11R:**

**FNB-31** pk. **4.8v 700mAh \$33.95**  
**FNB-38** pk. (5W) **9.6v 700mAh \$44.95**  
**BC-601b** **Rapid/Trickle Charger \$64.95**

For **YAESU FT-530 / 416 / 816 / 76 / 26:**

**FNB-26** pk. **7.2v 1200mAh \$29.95**  
**FNB-27s** pk. (5w) **12.0v 800mAh \$35.95**  
**FNB-27xh** (NiMH) **12.0v 1000mAh \$48.95**  
**BC-601a** **Rapid/Trickle Charger \$64.95**

For **YAESU FT-411 / 470 / 73 / 33 / 23:**

**FNB-10** pk. **7.2v 600mAh \$20.95**  
**FNB-11** pk. (5w) **12.0v 600mAh \$24.95**  
**FNB-11xh** (NiMH) **12.0v 1350mAh \$49.95**  
**FBA-10** **6-Cell AA case \$14.95**  
**BC-601a** **Rapid/Trickle Charger \$64.95**

Packs for **ALINCO DJ-580 / 582 / 180** radios:

**EBP-20ns** pk. **7.2v 1500mAh \$29.95**  
**EBP-22nh** (5w) **12.0v 1000mAh \$36.95**  
**EDH-11** **6-Cell AA case \$14.95**  
**BC-601d** **Rapid/Trickle Charger \$64.95**

For **ICOM IC-21A / T22-42A / W32A / T7A:**

**BP-180** pk. **7.2v 700mAh \$39.95**  
**BP-173** pk. (5w) **9.6v 700mAh \$49.95**  
**BC-601d** **Rapid/Trickle Charger \$64.95**

For **ICOM IC-W21A / 2GXAT / V21AT:**

**BP-131xh** (NiMH) **7.2v 1350mAh \$39.95**  
**BP-132s** (5w) **12.0v 850mAh \$39.95**  
**BC-601e** **Rapid/Trickle Charger \$64.95**

For **ICOM IC-2SAT / W2A / 3SAT / 4SAT etc:**

**BP-83** pk. **7.2v 600mAh \$23.95**  
**BP-84** pk. **7.2v 1200mAh \$34.95**  
**BP-83xh** (NiMH) **7.2v 1350mAh \$39.95**  
**BP-90** **6-Cell AA case \$15.95**  
**BC-79A** **Rapid/Trickle Charger \$64.95**

For **ICOM IC-02AT etc & REALISTIC HTX-202:**

**BP-8h** pk. **8.4v 1400mAh \$32.95**  
**BP-8xh** (NiMH) **8.4v 2250mAh \$52.95**  
**BP-202s** pk. **7.2v 1400mAh \$29.95**  
**IC-8** **8-Cell AA NiCd/Alkaline Case \$15.95**  
**K-1011/BC-35** **Rapid Charger \$59.95**

For **KENWOOD TH-79A / 42A / 22A:**

**PB-32** pk. **6.0v 700mAh \$22.95**  
**PB-34** pk. (5w) **9.6v 700mAh \$34.95**  
**KSC-14** **Dual Rapid/Trickle Charger \$64.95**

For **KENWOOD TH-78 / 48 / 28 / 27:**

**PB-13** pk. **7.2v 700mAh \$25.95**  
**PB-18xh** (NiMH) **7.2v 2250mAh \$49.95**  
**BC-15A** **Rapid/Trickle Charger \$64.95**

For **KENWOOD TH-77, 75, 55, 46, 45, 26, 25:**

**PB-6** (w/chg plug) **7.2v 600mAh \$27.95**  
**PB-8sh** pk. (5w) **12.0v 1000mAh \$39.95**  
**KSC-14** **Dual Rapid/Trickle Charger \$64.95**

For **STANDARD C-628A / C558A / 528A / 228A:**

**CNB-153** pk. **7.2v 1200mAh \$29.95**  
**CNB-152** pk. (5w) **12.0v 800mAh \$32.95**  
**CSA-181** **Rapid/Trickle Charger \$64.95**

Mr. NiCd also supplies batteries for your

**LAPTOP COMPUTERS / CELLPHONES  
CAMCORDERS / NiCd & NiMH INSERTS**

**We can rebuild your Computer pack! Call!!**

Mail, Phone, & Fax orders welcome! Pay with  
**MC / VISA / DISCOVER / AMEX**

**CALL OR WRITE FOR OUR FREE CATALOG!**

**Mr. NiCd - E.H. Yost & Company**

2211-D Parview Rd., Middleton, WI 53562

**Phone: (608) 831-3443**

**Fax: (608) 831-1082**

**E-mail: ehyost@midplains.net**

# Index of Advertisers

## ADVERTISING DEPARTMENT STAFF

**Brad A. Thomas, KC1EX, Advertising Manager**

**Hanan AlQaddumi, KB1AFX, Advertising Assistant**

**Robin Micket, N1WAL, Classified Coordinator**

**Direct Line: 860-594-0207 Fax: 860-594-0259**

**e-mail: ads@arrl.org** <http://www.arrl.org/ads>

ADI Communications: 13  
 Advanced Receiver Research: 136  
 AEA division of TEMPO RESEARCH CORP: 180  
 Alinco Electronics: 11  
 All Electronics Corp.: 162  
 Alpha Delta Communications: 150, 158  
 Alpha Power: 171  
 Alternative Arts: 132  
 Amateur Electronic Supply: 163, 165, 167, 169  
 Ameritron: 14  
 Antennas Are Us: 154  
 Antique Radio Classified: 163  
 Aria Industrial Corp.: 164  
 ARRL: 2, 138, 154, 160, 161, 163, 166, 176, 182, 198, 201  
 ARRL Publications BOOKCASE: 203, 204  
 ARRL Training Video: 196, 197  
 Associated Radio Communications: 184  
 Austin Amateur Radio Supply: 148, 149, 174  
 Autek Research: 179  
 Bencher Inc.: 166  
 Bilal Company: 184  
 Brian Beezley, K6STI: 25  
 Buckmaster Publishing: 154, 166, 182  
 Burghardt Amateur Supply: 153  
 Butternut Electronics: 128  
 C & S Sales Inc.: 144  
 C3I: 160  
 CABLE X-PERTS: 191  
 Code Quick: 140, 168  
 Comm-Putie Inc.: 188  
 Communication Concepts Inc.: 168  
 Communications Electronics Inc.: 177  
 Communications Specialists Inc.: 192  
 Computer Aided Technologies: 182  
 ComTek Systems: 154  
 Connect Systems Inc.: 168  
 Courage Handi Hams: 202  
 Cushcraft Corp.: 8  
 DATAMATRIX: 154  
 Davis RF: 190  
 DCI-Digital Communications Inc.: 191  
 Denver Amateur Radio Supply: 146  
 Diamond Antenna: 151  
 Dynamic Electronics Inc.: 180  
 Electro Communication Systems, Inc.: 174  
 EM Scientific, Inc.: 164  
 EMTECH: 184  
 EQF Software: 188  
 Fair Radio Sales: 170  
 Force 12: 205  
 GAP Antenna Products: 193  
 GLA Systems: 179  
 Gladiator Verticals/Myers Communications: 192  
 Glen Martin Engineering: 184  
 Hal Communications Corp.: 127  
 Ham Contact: 154  
 Ham Radio Outlet: 120, 121, 122, 123, 124, 125  
 Ham Station: 185  
 Hamsure: 170  
 Hamtronics NY: 26  
 Hi-Res Communications, Inc.: 132, 182  
 High Frequency Technology Inc.: 166  
 High Sierra Antennas: 202  
 ICOM America Inc.: Cover II, 1, 7  
 Idiom Press: 202  
 IIX Equipment Ltd.: 164, 192  
 International Antenna Corporation: 190  
 International Components Corp.: 170  
 Jan Crystals: 132  
 JPS Communications Inc.: 140  
 Jun's Electronics: 143  
 K-Com: 126  
 K2AW's Silicon Alley: 202  
 Kachina Communications Inc.: 147  
 KAWA Productions: 202  
 Kent Engineers: 164  
 Kenwood USA Corp.: 3, Cover IV  
 Kitano Key Company: 202  
 Lakeview Co. Inc.: 166  
 LDG Electronics: 142  
 Lentini Communications: 148, 149  
 Lewallen, Roy W7EL: 200  
 Link Communications: 168  
 LOGIC: 170  
 Lynx International Corporation: 202  
 M2 Enterprises: 186  
 Maha Communications & Electronics, Inc.: 22, 23

MCM Electronics: 189  
 Memphis Amateur Electronics: 179  
 Metal & Cable Corp.: 200  
 MFJ Enterprises: 129, 131, 133, 135, 137, 139, 141, 172  
 Micro Computer Concepts: 152  
 Micro Control Specialties: 192  
 Microcraft Corp.: 144  
 Mirage: 145  
 Mosley Electronics: 189  
 Motron Electronics: 188  
 Mouser Electronics: 190  
 N4XM, XMatch Antenna Tuner: 202  
 NCG Company: 157, 170  
 NMB Technologies, Inc.: 194  
 Olam Machinery, Inc.: 159  
 ONV Safety Belt Co.: 178  
 Palomar Engineers: 138  
 PC Electronics: 126, 156  
 Peet Bros. Co.: 128  
 Periphex Inc.: 142  
 Personal Database Applications: 170  
 Phillips-Tech Electronics: 163  
 Pixel Graphics X-Pressions: 190  
 Premier Communications: 13  
 PROLOG: 154  
 QRO Technologies, Inc.: 150  
 QSLs by K2QFL: 162  
 QSLs By W4MPY: 202  
 QSLs By WX9X: 180  
 Quantics: 170  
 R & L Electronics: 155  
 R. L. Drake Company: 199  
 Radio Amateur Callbook: 195  
 Radio BookStore: 200  
 Radio City: 148, 149  
 Radio Club of Junior HS 22: 188  
 Radio Shack: 181  
 Radio Works: 183  
 Rederring Embroidery: 168  
 RF Inquiry Inc.: 156  
 RF Limited: 194  
 RF Parts Co.: 151, 159, 161  
 RF Science & Technology: 163  
 Richmond Frostfest: 190  
 Rochester Hamfest: 178  
 Rohn: 138  
 Ross Distributing Co.: 202  
 RT Systems: 186  
 Sea Pac Ham Convention: 183  
 SGC Inc.: 146  
 Signal One: 170  
 Smithdom Products: 179  
 Sneed, Robinson & Gerber, Inc.: 164  
 Spi-Ro Mfg. Inc.: 160  
 Spider Antennas: 174  
 SSB Electronic USA: 132  
 Standard Amateur Radio Products: 27  
 Surplus Sales Of Nebraska: 136  
 Svetlana Electron Devices: 134  
 T. J. Antenna Company: 170  
 T.G.M. Communications: 161  
 Teletec Corp.: 158  
 Ten-Tec: 173, 175  
 Tennadyne: 130  
 Texas Towers: 207, 208  
 Tigertronics Inc.: 134  
 Timewave Technology Inc.: 159, 161  
 Tower Jack: 159  
 Traffic Technology: 178  
 TriQuint Semiconductor: 130  
 Tri-Ex Tower Corp.: 174  
 Tropical Hambooree: 187  
 Universal Radio Inc.: 148, 149  
 US Tower Corp.: 152  
 Vectronics: 6  
 Vi-Con International Inc.: 154  
 Vibroplex Co.: 154  
 Vis Study Guides: 132  
 W & W Associates: 185  
 W5YI Group Inc.: 132, 190, 200  
 W9INN Antennas: 180  
 Warren Gregoire & Associates: 200  
 Wheeler Applied Research: 140, 168  
 WJ2O Software: 200  
 Yaesu U.S.A.: Cover III, 17, 18  
 Yost & Co., E.H.: 206

**IC-775DSP ..... Call For Special Price!**

- 200 Watts
- Digital Notch
- Digital CW Filter
- Digital Noise Reduction
- True Dual Receive
- Auto Antenna Tuner
- Twin Pass Band Tuning

**COMPETITION CLASS HF PERFORMER****IC-821H ..... Please Call!**

- 2m / 70cm All Mode
- 45 / 35 Watts
- IF Shift
- 9600 Baud Mode
- 160 Memories
- RIT
- TCXO Option
- Multiple Scan
- More!

**GREAT SATELLITE PERFORMANCE!****IC-2710H ..... New, Low Price!**

- 2m/70cm Mobile
- 220 Memories
- Scanning
- Detachable Face
- CTCSS Encode
- Dual RX
- Dual In-Band RX
- Duplexer
- Much More!

An excellent dual band FM XCVR, offering separate VHF / UHF controls and a backlit DTMF Mic.

**EXCELLENT DUAL BAND PERFORMANCE!****IC-T22A ..... Please Call**

- 2m FM Handie Talkie
- Tiny: 2.3" W x 4.5" H x 1.1" D
- Extended Receive (136-174 MHz)
- 40 Memory Channels
- Alphanumeric Memory Names
- CTCSS Tone Encode
- EEPROM Memory Backup
- DTMF Paging Function
- Five DTMF Memories (30-digit)
- Multiple Scanning Modes
- Supplied with a Rechargeable NiCad Battery Pack, Plug-in Wall Charger, Belt Clip, and a Rubber Duck Antenna.

**AFFORDABLE 2M HANDIE TALKIE!**

# ICOM DEALS!

**IC-756 ..... NEW, Lower Price!**

- HF + 6m
- Twin PBT
- Display
- 100 Watts Out
- IF-DSP!
- 4.9" Dot Matrix LCD

**NOW IN STOCK—CALL FOR SPECIAL!****IC-706/MK-II ..... Now in Stock!**

- HF-2m All Mode
- 102 Memories
- CW Keyer
- Removable Display
- Spectrum Scope
- Scan
- Dot Matrix Display
- Tiny: 7" x 3" x 8"
- More!

**NEW, IMPROVED MODEL IN STOCK!****IC-2000H, 2M Mobile XCVR ..... Call!**

- 50 Watts Out
- 60 Memories
- AM RX
- Auto Offset
- Large Display
- Scanning
- CTCSS Encode
- DTMF Microphone
- More!

**AFFORDABLE 2M MOBILE PERFORMANCE!****IC-207H, New 2m/70cm Dual Bander ..... Call!**

- Compact Size
- 182 Memories
- Scanning
- Built-in Duplexer
- CTCSS Encode
- Dual RX
- CTCSS Scan
- CTCSS Decode
- 9600 bps

A great dual band FM XCVR at a great price, remote mounting option, supplied with a DTMF hand mic.

**AFFORDABLE DUAL BAND PERFORMER!****IC-W32A ..... NEW, Low Price!**

- 2m/70cm FM Handie Talkie
- Compact: 2.3" W x 5.5" H x 1.3" D
- 200 Memory Channels
- Independent Band Controls
- CTCSS Tone Encode
- CTCSS Tone Decode
- Dual In-Band Receive
- Extended Receive (118-174 MHz)
- Backlit LCD & Keypad
- Crossband Duplex
- Multiple Scanning Modes
- Supplied with a NiCad Battery Pack, Wall Charger, Belt Clip, and a Rubber Duck Antenna.

**AWESOME FEATURES — GREAT LOW PRICE!****IC-T7A ..... NEW, High Power!**

- 2m/70cm FM Handie Talkie
- Tiny: 2.3" W x 5" H x 1.1" D
- CTCSS Tone Encode
- CTCSS Tone Decode
- CTCSS Tone Scan Function
- Extended RX (118-174 MHz)
- AM Receive (118-136 MHz)
- 70 Memory Channels
- DTMF Paging & Squelch Option
- Multiple Scanning Modes
- Optional Programming Software
- Supplied with NiCad Battery Pack, Wall Charger, Belt Clip, Rubber Duck, and More!

**GREAT HT — GREAT LOW PRICE!****CALL  
TOLL  
FREE****(800) 272-3467****e-mail: sales@TexasTowers.com**   **internet: http://www.TexasTowers.com****TECH  
LINE****(972) 422-7306**   **FAX  
LINE**   **(972) 881-0776****TEXAS TOWERS****A Division of Texas RF Distributors, Inc. • 1108 Summit Avenue, Suite #4 • Plano, TX 75074 • U.S.A.**

**HUGE ICOM DEALS!**  
 VISIT US ON THE WEB! <http://www.TexasTowers.com>

# HUGE YAESU DEALS!

VISIT US ON THE WEB! <http://www.TexasTowers.com>



**FT-1000MP** Please Call For Special!  
**FT-1000D\* / FT-1000\*** ... Please Call!

**\* PLUS \$200 OFF YAESU COUPON! \***



**FT-900CAT** ..... Please Call

Get a FREE YSK-900 Remote Kit with purchase.  
 • 160-10m XCVR • 100 W Output • Auto Tuner

**FREE YSK-900 WITH PURCHASE!**



**FT-8500, 2m/70cm Mobile** ..... Call!  
**FT-8100, NEW 2m/70cm Mobile** ..... Call!

**EXCELLENT DUAL BAND PERFORMANCE!**



**FT-11R High Power** ..... Call!

- 150 Memory Channels
- CTCSS Tone Encode
- DTMF Paging & Squelch
- Extended RX (110-174 MHz)
- Supplied with FNB-31 NiCad, Charger, Belt Clip, and Duck.

**FT-51RH High Power** ... Call!

- 120 Memory Channels
- Alpha Numeric Display
- AM Receive (110-138 MHz)
- Tone Encode, Decode & scan
- DTMF Paging & Squelch
- Ext RX (110-180, 420-470 MHz)
- Supplied with FNB-31 NiCad Charger, Belt Clip, and Duck.

**EXCELLENT 2M HT PERFORMANCE!**

# YAESU DEALS

Texas Towers has Yaesu specials galore! In addition to our every day low prices, Yaesu is offering additional savings coupons for several of the radios shown on this page. So be sure to give us a call—Texas Towers really does sell for less!



Features: 34 sq. ft. capacity, 450° rotation, preset control, and more!

**G-2800SDX (34 sq. ft.)\*** ... Call for price!

**G-1000SDX (23.5 sq. ft.)\*** ... Call for price!

**G-800S / SDX (17 sq. ft.)\*** ... Please Call!

**G-450XL (11 sq. ft.)** ..... Please Call!

**G-5400B Az/Elevation\*** ... Please Call!

**G-500 Elevation Rotor** ... Call for price!

**EXCELLENT ROTATOR DEALS!**



**FT-10R/A16-41B** ..... Call!

**FT-10R/A16D-41B** ..... Call!

- 30 Memory Channels
- CTCSS Tone Encode
- DTMF Paging & Squelch
- Extended RX (140-174 MHz)
- Supplied with FNB-41 NiCad, Charger, Belt Clip, and Duck.

**FT-50RD** ..... Call!

- 112 Memory Channels
- CTCSS Tone Encode & Decode
- DTMF Paging & Squelch
- 76-200, 300-540, 590-999 MHz RX
- Supplied with FNB-41 NiCad, Charger, Belt Clip, and Duck.

**GREAT DUAL BAND PERFORMANCE—LOW PRICE!**



**FT-920** ... New, Call For Special Price!

- HF-6m • DSP • Auto Tuner • More

**NOW AVAILABLE, CALL NOW!**



**FT-840** ..... Call For Yaesu Spec

- 160-10m XCVR • 100 W Output • FM Ops
- Compact Size • LCD Display • Much More

**\$100 COUPON FOR ADDED SAVINGS**



**FT-2500 2m Mobile XCVR** ..... Call!

**FT-3000 2M Mobile XCVR, 70W** ..... Call!

**\$30 OFF YAESU COUPON FOR FT-2500**



**FT-1R** ..... NEW, Call for Price!

- Micro Miniature Size Dual Band
- .5 Watts on 2m & 70cm
- 290 Memory Channels
- Alpha Numeric Display
- CTCSS Tone Encode
- CTCSS Tone Decode
- DCS Paging & Squelch
- DTMF Autodialer (15-digit)
- Extended RX (76-999 MHz)
- (.5-1.7 MHz)
- AM / FM / FM-WIDE Modes
- Dual Watch Receiver
- Lithium Ion Battery Pack
- One Hour Charge Time
- Supplied with Battery, Charger, Belt Clip, Strap, and Duck.

**EXCELLENT DUAL BAND PERFORMANCE!**

Prices, specifications, and stock quantities are subject to change without notice or obligation.

CALL  
TOLL  
FREE

# (800) 272-3467

e-mail: [sales@TexasTowers.com](mailto:sales@TexasTowers.com) internet: <http://www.TexasTowers.com>

TECH  
LINE

(972) 422-7306

FAX  
LINE

(972) 881-0776



# TEXAS TOWERS

A Division of Texas RF Distributors, Inc. • 1108 Summit Avenue, Suite #4 • Plano, TX 75074 • U.S.A.

WEEKDAYS:  
CENTRAL TIME  
9AM-5PM  
  
SATURDAYS:  
9AM-1PM  
M/C • VISA  
DISCOVER

"The FT-920 is packed with really high-tech features!"

"And, it's got 6 meters built in, too!"



"Yeah! Shuttle Jog, DSP--with a 33MIPS\* processor--fastest on the market."

"Looks like Yaesu did it again!"

# FT-920

All-Mode HF/6m Transceiver

You know the difference--and so does Yaesu. Signals buried in noise and interference miraculously appear at your speaker--the surest indicator of HF quality. As always, cutting-edge technology inside separates the world leader in amateur radio from the rest of the pack. No surprise to you.

What makes the difference? High-performance 33MIPS\* Digital Signal Processing (DSP), for razor-sharp selectivity, increased average power output, and voice pattern contour choice; automatic seeking DSP Notch filter and Noise Reduction; built-in high-speed antenna tuner for RX and TX; user-friendly DSP Bandwidth controls for enhanced interference reduction; and exclusive Shuttle Jog tuning controls for fine or rapid frequency excursions. For operating efficiency, the FT-920 also has a Digital Voice Recorder and Electronic Memory Message Memory Keyer. Providing up to

100W of adjustable power output on all amateur bands from 160 through 6 meters, the FT-920 uses rugged, low-distortion MOS FET final amplifier transistors. SSB, CW, AM (25W carrier), AFSK, and FSK are built in, with FM, optional.

All of this, and an ergonomically-designed front panel--including Yaesu's renowned Omni-Glow™ display--give you the highest-performing, HF/6 meter rig in its price class.

For more details on the new and different FT-920, call or write for a free brochure, or better yet: hear the difference at your dealer today!

## YAESU

...Choice of the World's top DX'ers

For the latest Yaesu news, hottest products, visit us on the internet: <http://www.yaesu.com>

### Features

- High Performance 33 MIPS\* Digital Signal Processing (DSP) in all Modes with one touch control
- HF + 50 MHz with 100 Watts Output on all Bands
- New Design MOSFET PA Finals
- Built-in High Speed Auto Antenna Tuner including 50 MHz (Antenna Tuner works on both RX & TX)
- Auto Notch/Noise Reduction Control
- Simplified Tuning with Shuttle Jog Control
- Omni-Glow™ Dual Display with Twin VFO Knobs
- Separate FET RF Amplifier for High & Low Bands
- Digital Voice Memory System
- Quick Memory Bank (QMB) Instant Frequency Memory System

\*Million Instructions Per Second



State-of-the-Art  
DSP Bandwidth Controls



©1997 Yaesu USA, 17210 Edwards Road, Cerritos, CA 90703, (562) 404-2700

Specifications subject to change without notice. Specifications guaranteed only within amateur bands. Some accessories and/or options are standard in certain areas. Check with your local Yaesu dealer for specific details. Collins is a trademark of Rockwell International Corporation.

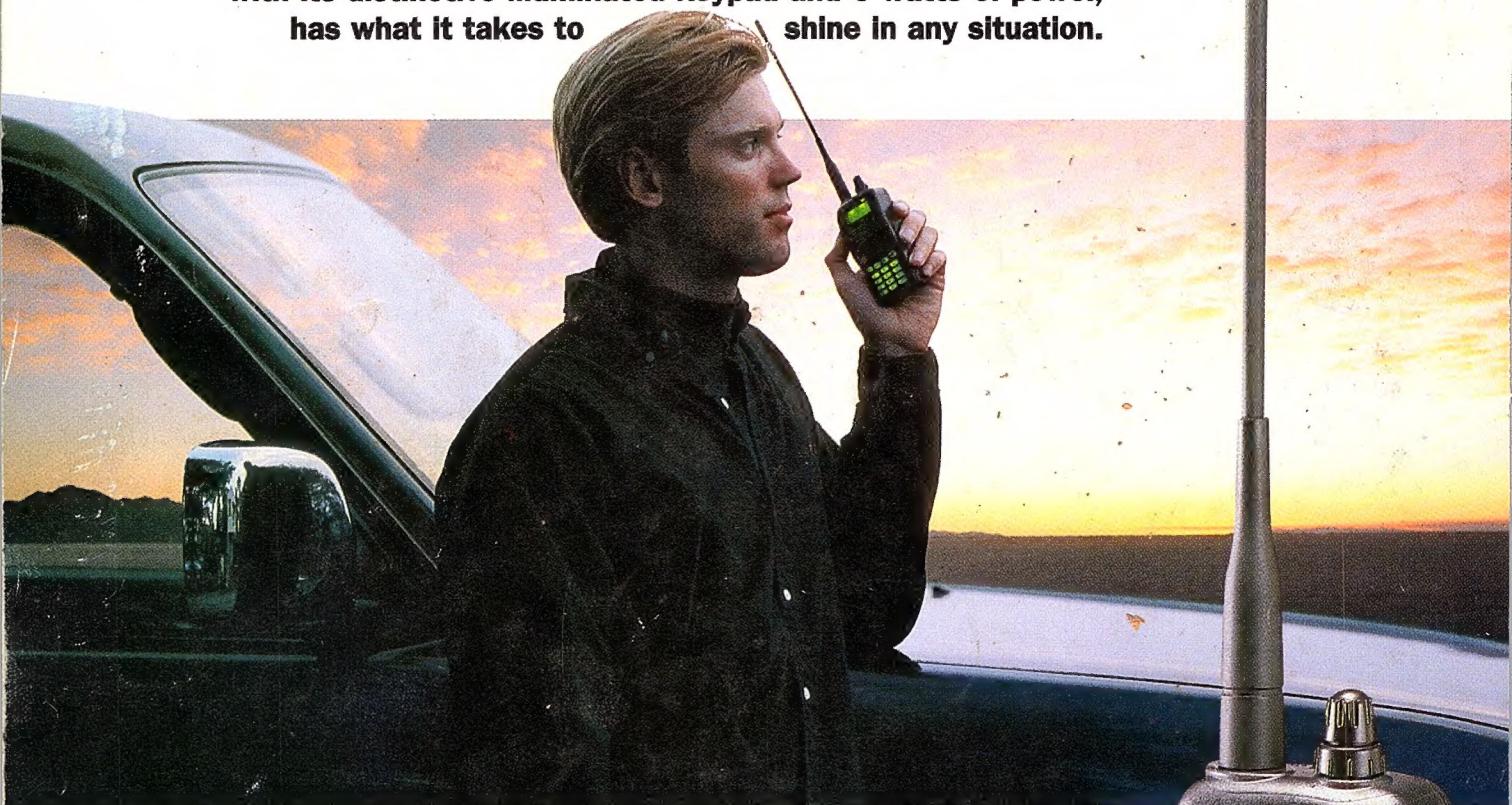


### FT-1000MP

This HF standout features a high-intercept front end design, EDSP, and built-in Collins SSB Mechanical Filter.

# Look on the brighter side of handhelds

**Kenwood's new TH-G71A dual-bander (144MHz/440MHz),  
with its distinctive illuminated keypad and 6 watts of power,  
has what it takes to  
shine in any situation.**



## TH-G71A 144/440/MHz FM DUAL BANDER

If you're looking for a compact dual-bander with all the right features, yet without the price tag that usually goes with high performance, there's no better choice than the TH-G71A.

Just hold it in your hand and it's immediately clear how well our new handheld transceiver is engineered. The ergonomic design, **illuminated keys** and **backlit display** all combine to make operation a breeze. As does the menu mode, which allows you to customize the TH-G71A by adjusting all major settings to your choice. Besides being easy to use, it also boasts extraordinary power – up to 6 watts (VHF) or 5.5 watts (UHF) of RF output (selectable) with its **high-performance antenna**. The speaker provides **powerful, refreshingly clear audio**.

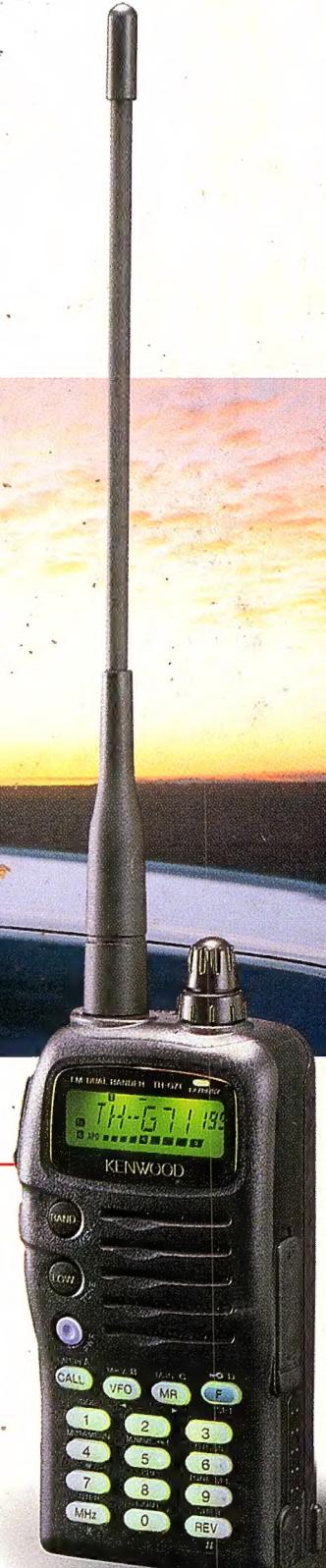
Of course, power is only part of the picture. Features count. And you can count on the TH-G71A to offer what you'd only expect to find in far more expensive HTs. There are **200 memory channels** – allowing you to store transmit and receive frequencies independently. Memory data can even be edited and stored on your PC. Multiple scan functions are available, including programmable band scan, memory scan with memory channel lock-out, MHz scan and call scan. For each band there are TO (time-operated), CO (carrier-operated) and seek scan resume modes. With the Memory Name

function you can choose to identify each channel with up to **6 alphanumeric characters**. DTMF memory and CTCSS tone encode/decode are provided.

The TH-G71A also scores well for stamina and reliability, boasting long battery life – thanks to a variety of power-saving features – and **MIL-STD 810E** compliance for rain & shock resistance. So there's no need to go easy on this dual-bander. It's built better and brighter in every way.

- **6W (VHF), 5.5W (UHF) at 13.8V DC**
- **PC programmable**
- **200 memory ch. with alphanumeric display**
- **MIL-STD 810E (rain & shock)**
- **CTCSS tone scan**
- **Wide-range coverage (incl. aircraft receive)\***
- **DTMF memory (10 ch. up to 16 digits)**
- **Multiple scan modes**
- **Key illumination**
- **High-performance antenna**
- **HI/LOW/EL power output selectable**
- **TM-V7A remote control (DTMF remote)**

\* Specifications are guaranteed for Amateur Bands only



ISO 9001  
JQA-1205

**KENWOOD**  
Amateur Radio Products Group  
97ARD-1670

KENWOOD COMMUNICATIONS CORPORATION  
AMATEUR RADIO PRODUCTS GROUP  
P.O. Box 22745, 2201 E. Dominguez St., Long Beach, CA 90801-5745, U.S.A.  
Customer Support/Brochures (310) 639-5300  
KENWOOD ELECTRONICS CANADA INC.  
6070 Kestrel Road, Mississauga, Ontario, Canada L5T 1S8

**INTERNET**

Kenwood News & Products  
<http://www.kenwood.net>  
Kenwood Bulletins  
<ftp://ftp.kenwood.net>